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Testing the New Suburbanism: Exploring Attitudes of Local Residents in Metropolitan Boston toward Residential Neighborhoods and Sustainable Development

Nicole A. West
University of Massachusetts Amherst

TESTING THE NEW SUBURBANISM: EXPLORING ATTITUDES OF LOCAL RESIDENTS IN METROPOLITAN BOSTON TOWARD RESIDENTIAL NEIGHBORHOODS AND SUSTAINABLE DEVELOPMENT

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NICOLE WEST

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Approved as to style and content by:

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Robert Ryan, Chair

_____
Elizabeth Brabec, Member

_____
Paul Fisette, Member

_____
Elizabeth Brabec, Department Head,
Landscape Architecture and Regional Planning

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ABSTRACT

TESTING THE NEW SUBURBANISM: EXPLORING ATTITUDES OF LOCAL RESIDENTS IN METROPOLITAN BOSTON TOWARD RESIDENTIAL NEIGHBORHOODS AND SUSTAINABLE DEVELOPMENT

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NICOLE WEST, B.S. HUMBOLDT STATE UNIVERSITY
M.R.P, M.L.A. UNIVERSITY OF MASSACHUSETTS AMHERST

Chair: Professor Robert Ryan

Low-density residential development patterns in New England have resulted in the excessive loss of farms, forests and other open spaces and increased automobile dependence. Coupled with increasingly high land costs, sprawl has contributed towards an affordable housing crisis in Massachusetts. The need for sustainable development (such as new urbanism and smart growth) has been increasingly recognized, yet efforts have been hampered, in part, due to apathy and local residents' resistance towards increasing residential densities, resulting in limited choices for willing homebuyers.

This study examines perceptions of residential neighborhoods and sustainable development among residents in Hopkinton and Southborough, Massachusetts; two communities with rural and suburban character located in the rapidly growing metropolitan Boston region. A photo-based survey sent through the mail asked respondents to rate scenes of innovative residential settings and to answer questions about their attitudes towards environmental issues, planning approaches and neighborhood preferences, their current residential setting and demographic characteristics.

The results from 253 survey respondents showed three important themes: (1) that residents expressed strong environmental values yet many lacked awareness of the

environmental impacts of low density housing, (2) strong preference for views of nature and open spaces was prevalent and (3) visual design variables can dramatically influence perceived density.

Key findings indicate two sub-groups. Approximately one-third of the respondents strongly support denser, sustainable development alternatives and value neighborhood planning that reduces auto dependency, meets the needs of households with various incomes and protects open space. While, the other two-thirds of the sample favor calm, scenic, low density neighborhoods and would like to see their community preserve its open spaces and maintain its historic and rural aesthetic.

The study concludes with recommendations for regionally appropriate approaches to sustainable development that take into account the multiple scales and stakeholder involvement.

Keywords: sprawl, sustainable development, new urbanism, smart growth, residential development, public attitudes, land-use planning, traditional neighborhood development, transit oriented development, cluster development, conservation subdivision, landscape preference, residential choice.

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CHAPTER 1

INTRODUCTION: RESIDENTIAL NEIGHBORHOOD DEVELOPMENT IN METROPOLITAN BOSTON

1.1 Suburban Sprawl, Growth Pressures, Local Character & Sustainable Development

Increasingly, planning and design professionals have come to perceive the implementation of strategies that facilitate a high quality of life while respecting ecological limits to be a core component of contemporary professional practice. This is affirmed by the sustainable development goals of professional organizations such as the American Society of Landscape Architects and the American Planning Association. In addition, for over a decade, environmental stewardship has been a primary goal for numerous branches government, including, Massachusetts's Executive Office of Energy and Environmental Affairs (EOEA, 2008).

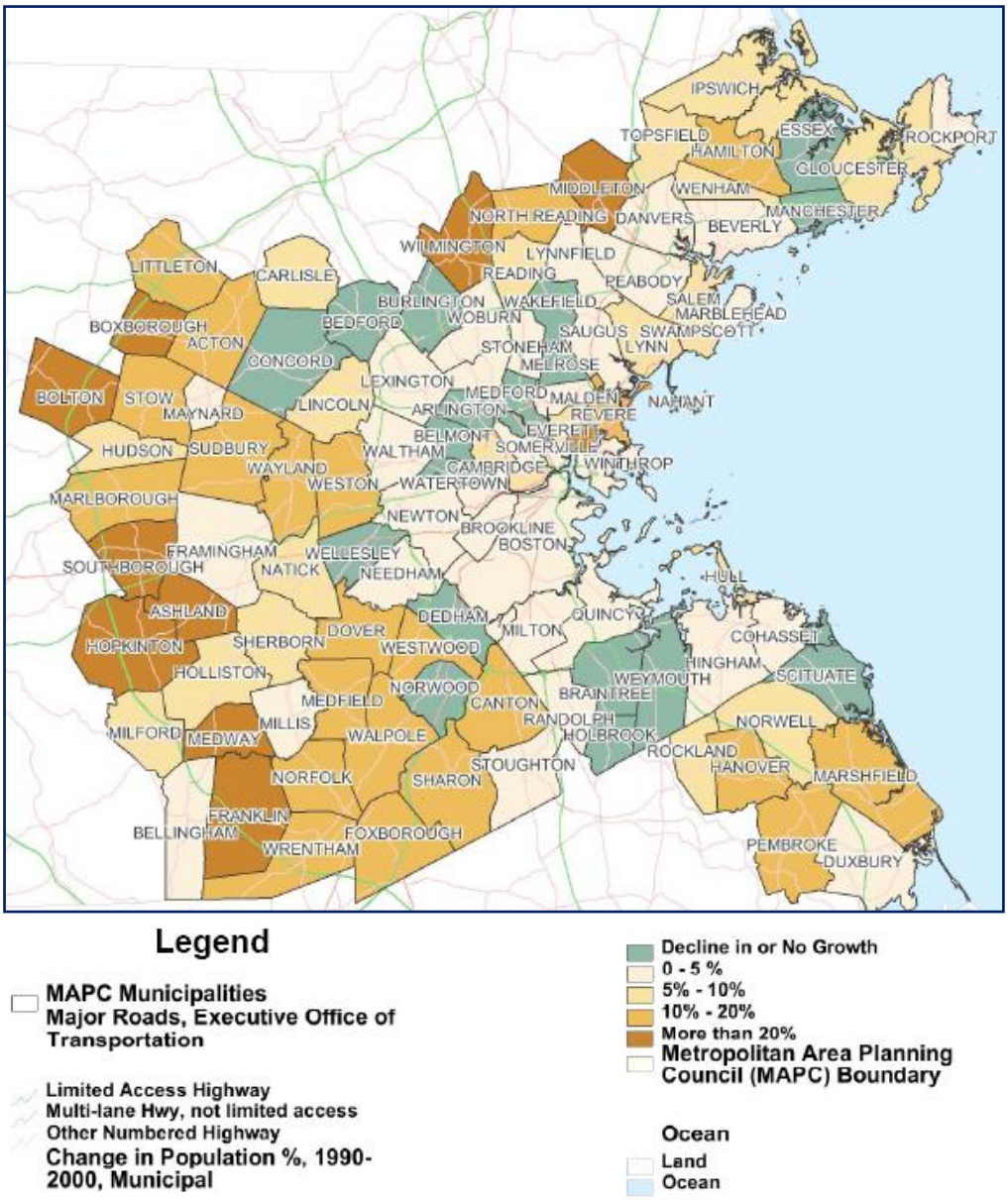
"The Commonwealth of Massachusetts shall care for the built and natural environment by promoting sustainable development through integrated energy and environment, housing and economic development, transportation and other policies, programs, investments, and regulations. The Commonwealth will encourage the coordination and cooperation of all agencies, invest public funds wisely in smart growth and equitable development, give priority to investments that will deliver good jobs and good wages, transit access, housing, and open space, in accordance with the following sustainable development principles. Furthermore, the Commonwealth shall seek to advance these principles in partnership with regional and municipal governments, non-profit organizations, business, and other stakeholders."

- Executive Office of Energy and Environmental Affairs (EOEA), Introduction to Sustainable Development Principles

Meeting the goals of sustainable development hinges on the recognition that cumulative effects of many individual land use decisions have large impacts. Sprawling development patterns impact larger areas of land to provide the same amount of amenities that can be satisfied with less land area, if compact layouts are utilized. Results of the decentralized and inefficient pattern of growth known as sprawl include excessive loss of farms, forest and other open spaces and increased automobile dependence. Additionally, the dominance of low-density, large-lot residential development coupled with increasingly high land costs has contributed towards an affordable housing crisis in Massachusetts (Executive Office of Energy and Environmental Affairs (EOEA), 2008).

Despite the case that has been built for more compact and sustainable patterns of growth, widespread changes to development practices have been hampered, in part due to local apathy and resistance towards increasing residential densities. If this issue is not addressed in time, regions throughout the state where growth is projected to be significant may lose much of their remaining open space. The Boston Metropolitan Area Planning Council (MAPC), the regional planning agency for 101 cities and towns across metropolitan Boston estimates that along with a predicted 10% growth in jobs, the Greater Boston Region could add 465,000 residents from 2000 – 2030. This would translate to a need for 300,000 new housing units, potentially resulting in the loss of 130,000 acres of open space (Boston Metropolitan Area Planning Council (MAPC), 2007).

Figure 1.1: Communities of the Metropolitan Area Planning Council, Percent Change in Population from 1990-2000 (Map: MetroBoston DataCommon, 2008)



Communities at the western edge of metropolitan Boston are characterized by low-density residential development, which contributes to apathy and resistance towards building at greater residential densities. However, as seen in Figure 1.1, communities in the MetroWest area, along the I-495 corridor, compared with the rest of metropolitan Boston, have experienced the greatest percentage increase in growth in recent years. Therefore, it is crucial to study these issues here, where maintaining large-lot patterns of development in the face of such growth pressures constitutes a major threat to farms, forests and other open spaces and could severely exacerbate the affordable housing crisis.

1.2 Thesis Purpose, Goals & Objectives

The purpose of this research is to examine perceptions of residential neighborhoods and sustainable development among residents in Hopkinton and Southborough, Massachusetts, two communities currently facing growth pressures located at the western edge of metropolitan Boston (Figure 1.1). To measure perceptions, a photo-based survey that also included a series of written questions was administered by postal mail. Respondents were asked to rate scenes of innovative residential settings according to the scene's compatibility with their town.

The goals for this project are to:

1. Discern new patterns of residential neighborhoods and approaches to sustainable development that are appropriate for suburban and metropolitan-

rural fringe areas to address development pressures that degrade the physical, environmental, and cultural landscape and ,

2. Develop recommendations for developers, designers, planners and municipalities as they attempt to implement innovative developments in regions with similar characteristics.

The objectives for meeting the goals are:

1. Determine which design components contribute towards the acceptability of developments with greater residential densities and the other common components of sustainable development (For this study, the perception of high density is more important than the technical definition. 'Greater residential densities' can refer to a residential development that has a higher density than what is typical for Hopkinton and Southborough, or for a respondent's neighborhood.).
2. Discern patterns amongst people's perceptions of residential neighborhoods and sustainable development within the study sample, based on demographic characteristics, neighborhood characteristics, attitudes towards their current residential setting, attitudes towards environmental issues and planning approaches and their ideal residential settings and ratings of the photographs.

This study will help reveal patterns of residential development and design features that are less likely to receive opposition from community members in the metropolitan Boston region and more likely to be marketable to homebuyers. It is

hoped that the lessons learned in this study will be transferable to other locations and will help planners, designers, developers and municipalities overcome barriers to implementing alternative development models to address environmental and social issues.

In a broad sense, this research relates to the field of environmental psychology and environment-behavior theory because it explores the relationship between people and their surroundings. Specifically, preferred environments/ residential choice and conservation behavior are areas of study which are closely related to this research. Photo questionnaires have been used reliably by many researchers to gauge respondents' preference for various environments (Tilt, 2006; Kaplan and Kaplan, 1989; and Kaplan, 1985; Jorgensen, 2006). They have also been used to determine respondents' perceptions of rural character (Ryan, 2002).

1.3 Research Questions & Hypotheses

What factors influence local residents' acceptance of higher residential densities? How are people's levels of acceptance of higher residential densities affected by the following?

- Their attitudes towards environmental issues and planning approaches?
- Their attitudes about their current residential setting?
- Characteristics of their current residential setting?
- Their demographic characteristics?

- Knowledge that a development used environmentally friendly practices or lessens auto dependence?
- Visual design variables?

How important is sustainable development to local residents? How willing are homebuyers to make trade-offs in favor of components of sustainable development?

One hypothesis is that the greater the quality of and presence of desirable design features in a development, (such as trees) the greater compatibility rating it will receive. Given the literature on people's desire for views of nature and easily accessible open space (which is discussed in the following chapter,) this hypothesis is a likely outcome (Kaplan, 2001, 2004; Kearney, 2006; Sullivan, 2006; Jorgensen, 2007).

It is also predicted that the more similar a photo of a neighborhood appears to a respondent's current neighborhood, the more likely they will be to find it acceptable. In other words, will people's level of acceptance of higher density correlate with the density of their own neighborhood (i.e. if someone currently lives in a relatively dense village center, will they be more accepting of higher densities in general and conversely, if someone lives in a low density setting, will they be less accepting of greater densities?) A similar response to a photo questionnaire was found by Ryan (2002, p. 32) where "residents who lived on small lots were significantly more likely to indicate that the subdivision scenes were compatible with the rural character of town than were residents of larger rural parcels."

Given the continued popularity of sustainability and market value of "green" products, discussed in the following chapter, the study also proposes that knowledge

that a development was built with sustainable design features will increase its acceptance.

This study can contribute to this area of knowledge by revealing which patterns of denser residential developments are perceived to be compatible with suburban towns that have historic and rural qualities. Comparing the specific design components in the images may reveal features that can be incorporated, avoided, or mitigated with future designs, depending on the ratings of the images. For example, if the photographs that received the highest ratings all have street trees as prominent elements in the scene, it may be concluded that, despite an increased density, street trees as a design variable can contribute to the compatibility of a new development with an existing neighborhood.

1.4 Scope of Research & Organization of Study

The next two chapters cover a literature review (chapter 2) and a description of the study area and research methods (chapter 3). The two subsequent chapters (4 and 5) report, and then discuss the results of the survey. Lastly, recommendations (chapter 6) and a conclusion (chapter 7) are offered.

The literature review identifies unsustainable development patterns and their environmental and social consequences. These development patterns are the current norm in America, (Calthorpe, 1993; Flint, 2005; Meyers, 2001), thusly reflecting entrenched cultural attitudes (Flint, 2005; Holleb, 1978; Kain, 1967; McGinn, 2008), which are examined in this research. A compelling argument is presented in favor of implementing alternative development models to address environmental and social

issues (Arendt, 1996; Goldberg, 2007; Haughey, 2005; Lund, 2003; Massachusetts Executive Office of Energy and Environmental Affairs (EOEA), 2008; Schmitz, 2004; Thompson, 2004).

Additionally, the literature review identifies barriers to implementing alternative development models and discusses strategies for overcoming those barriers (Calkins, 2004; Churchman, 1999; Flint, 2005, 2006; Haughey, 2005; Obrinsky, 2007; O'Connell, 2003; O'Keefe, 2003; Pawlukiewicz, 2002; Shively, 2007). One such barrier, the perception (real and/ or imagined), of the lack of a market for denser residential neighborhoods, sustainable development, or green building materials and practices is thusly countered (Bright, 2007; Goldberg, 2007; Meyers, 2001; National Association of Realtors, 2004; Schmitz, 2004; Steuteville, 2007; Tu and Eppli, 1999, 2001; and Zweigart, 2007).

Coverage of the survey component of the research begins with Chapter 3. It starts with descriptions of the study area, first of the regional context and then of the two Massachusetts towns, Hopkinton and Southborough. Descriptions of the study sample and data analysis methods follow. Chapter 4 reports results from the survey, first by looking at the data in aggregate, then by looking at the data according to group differences in respondents' perspectives.

Chapter 4 begins with respondents' perspectives about the town they live in; what they like about it, how it has changed, current issues and concerns about future development. Next, respondents' ratings of the compatibility of 40 scenes of innovative residential neighborhoods are reported. The next section reports respondents' level of preference for neighborhood features such as proximity to

amenities, public parks and energy efficiency. Following is a discussion about the tension between open space protection and compact development based on a comparison of certain answers about neighborhood features and issues that were reported earlier in the chapter.

The next three sections explore the degree to which respondents value various aspects of sustainable development. Although the seven different neighborhoods in the photographs were built in accordance with sustainability principles, respondents may not have known, as they were not given additional information. Consequently, photo ratings alone do not imply favor or disfavor for sustainable development. To investigate these issues, a question was added directly following the photo rating segment asking respondents whether they would rate the photographs differently if they had known certain things about them (for example, that the homes were energy efficient or located near transit stops.) The next section centers on how willing respondents would be to make certain trade-offs for more environmentally friendly neighborhood features, should they be shopping for a home. Following is a comparison of certain results reported earlier to investigate whether survey participants matched their stated level of environmental ideals with responses to questions based on choices or actions that could support those environmental ideals.

While the previously described sections of chapter 4 deal with data in aggregate, the remainder of the chapter deals with group differences in respondents' perspectives. Through data analysis reliant on t-tests, two sub-groups emerged. One supports denser, sustainable development alternatives and values neighborhood planning that reduces auto dependency, meets the needs of households with various

incomes and protects open space. A larger sub-group is comprised of residents who favor calm, scenic, low density neighborhoods and would like to see their community preserve its open spaces and maintain its historic and rural aesthetic. The final section of chapter 4 reports the influence of demographic variables and residential setting on respondents' perspectives.

Chapter 5 discusses key findings and makes comparisons with previous studies. First the chapter explores the possibility that certain unique demographic characteristics of the sample strongly contributed to their responses. Next, the discussion moves to the two major sub-groups reported in the last chapter. The following three sections address the impact of additional factors on respondents' answers; current neighborhood setting, preference for views of nature and open spaces and visual design variables that influenced perceived density. The final topics of the chapter are opportunities for future research and assessment of survey methods.

Recommendations are offered in chapter 6 that take into account the multiple scales and stakeholders that these issues involve. The first set of recommendations discusses coordinating conservation and development priorities amongst various government departments and agencies, non-profit organizations, corporations and other relevant groups. Next insights from the survey and previous studies are drawn upon to inform recommendations for context-sensitive sustainable design, as well as strategies for involving the community, addressing concerns and gaining support for sustainable development projects, plans and policies. Finally, chapter 7 offers concluding remarks.

CHAPTER 2

PATTERNS OF RESIDENTIAL DEVELOPMENT

2.1 Large-Lot, Low Density Suburbs & Auto-Oriented Sprawl

Massachusetts is facing a pressing land use crisis. A startling report issued by the Massachusetts Audubon in 2003, titled: *Losing Ground: At What Cost?* draws attention to the statewide loss of farms, forests and other open spaces. Between 1985 and 1999 the state continued to lose 40 acres per day to "visible" development (as interpreted from aerial photography). Nine out of ten acres were used for residential development, 65 percent of which was used for low-density, large-lot housing (Breunig, 2003).

The trend towards suburban lifestyles began in America as early as the 1800s; however in the last few decades alone both lot sizes and home sizes have increased dramatically. "Between 1987 and 2001, the median size of new homes [in the United States] increased nearly every year, from 1,755 to 2,100 square feet" (Schmitz, 2004, 53). In 1950 the average home size in the U.S. was 980 square feet. By 2006, average home size of new construction had risen 150% to 2,430 square feet (McGinn, 2008).

Statewide in Massachusetts, since 1970, average residential building lot sizes have increased 47 percent (Breunig, 2003). In the next fifty years, communities in Massachusetts will face demands that engender the increased urbanization of suburbs and the increased suburbanization of rural areas. As land becomes scarcer, developing at low densities will be increasingly impractical. Building at greater densities is a

smart strategy for accommodating people while reducing development pressure on farms and forests, especially when used in concert with land conservation measures. Besides the intrinsic value of natural areas, the ecosystem services that they provide are simply too valuable to waste.

The predominance of large-lot zoning combined with rising land costs has greatly contributed to an affordable housing crisis in Massachusetts (Executive Office of Energy and Environmental Affairs (EOEA), 2008; Boston Metropolitan Area Planning Council (MAPC), 2007). Throughout the state, many residents, such as first-time homebuyers or elders struggle to remain in their communities. Failure to build a variety of housing types will exclude the groups of people that give communities a diversity of interests, experiences, and human and labor capital.

A strong desire to protect the rural character of growing communities in metropolitan-rural fringe regions has led some to promote large-lot residential zoning as a way to preserve character. Many see large-lot zoning as a way to preserve rural character because it keeps buildings and paving to a relatively small amount and typically results in green, open spaces (Michigan Environmental Council, 2004).

However, when compared with a scenario where the same amount of residential lots on the same land area were clustered and reduced to half their size and the remaining land area was preserved as agricultural or as a forest or meadow with recreational trails available to the community, then the environmental and social drawbacks of using large-lot zoning to preserve rural character become more clear. In yet another scenario, the rural-fringe lots could be permanently protected and the same amount of homes that would have gone there could be developed more

compactly in or near a village center, in a place already serviced by infrastructure and walking distance to amenities (Michigan Environmental Council, 2004).

Researchers studying these issues in rapidly suburbanizing rural-fringe areas in Michigan found that it was not only residents who perceive large-lot residential zoning as a way to preserve character, but some of the professional planners as well, "Several officials feel open space is improved through large lot zoning, because they characterize two-acre and larger parcels as open space despite the fragmented nature and private ownership of these areas" (Michigan Environmental Council, 2004, pg. 16). Other officials said sprawl was good because it provides the town with tax dollars. Many officials cited a lack of available infrastructure, including water and sewer (and if not sewer, insufficient land area for a septic system), as incentives for maintaining large lot zoning (Michigan Environmental Council, 2004).

The environmental consequences of unsustainable patterns of development are well documented (Union of Concerned Scientists, 2005; U.S. Environmental Protection Agency, 2006). Inefficient land use contributes to habitat fragmentation, which is the leading cause of species endangerment and biodiversity loss (Thompson, 2004). In the process of constructing low-density subdivisions, pre-existing plant communities with high ecological value, such as forest and meadow, are typically removed. As lawns are monocultures; their attendant chemicals and nutrients pollute local hydrologic systems; in many locations, they demand more watering than is provided by rainfall; they contribute (along with impervious surfaces) to stream flooding because runoff rates are higher than native vegetation or landscaping; mowers use fossil fuels and an estimated 10% of the content of landfills are lawn

clippings (Thompson, 2004). Developing compactly is a smart strategy for keeping the amount of land area devoted to lawns to a minimum.

Looking back at the last hundred years of trends in the built environment, one could argue that the automobile has done more to influence the spatial organization of cities and towns than any other invention. Automobiles have made single-use zoning and building at low densities feasible and popular. While the automobile has done much to enhance peoples' lives, offering mobility, convenience and economic advancement, the unintended negative consequences of automobile dependence must be addressed. The negative impacts of auto-oriented sprawl are environmental (air and water quality degradation, oil spills, acid rain and global warming) and social (traffic, long commutes, isolation, obesity) (Union of Concerned Scientists, 2005; U.S. Environmental Protection Agency, 2006; Calthorpe, 1993).

While many are aware of these consequences, due to the design of our neighborhoods, most Americans remain dependent on their cars for daily activities such as going to work, school or grocery shopping. Numerous grassroots efforts to promote alternative modes of travel such as walking, biking and public transportation have emerged in the last several decades (National Center for Bicycling & Walking (NCBW), 2008; Association of Pedestrian and Bicycle Professionals, 2008).

Since factors such as neighborhood layout, wield great influence on the adoption of alternative modes of travel, it is the imperative for those in the business of creating the built environment is to address these issues at the planning and design levels.

2.2 Historical Context & Current Trends

During the last century, a largely positive association with the low residential density of suburbs has reigned—in sharp contrast to negative associations with the high residential density of urbanized areas. Significant historic trends in America have shaped these perceptions and continue to influence cultural norms today.

The streetcar and automobile made it possible for those with the means to live in low density communities. Moving to the suburbs was seen as “moving up” the social ladder (Flint, 2005). From the westward expansion of the 1800s, to the streetcar suburbs of the early 1900s, to the post World War II suburbia of the 1950s, to the McMansions of the 1990s, development continued its trend towards ever sprawling spatial patterns. Television shows such as "Ozzie and Harriet", “Father Knows Best" and "Leave it to Beaver" established the image of the suburban nuclear family as the ideal (McGinn, 2008). Civic unrest and racism in American cities during the 1960s contributed to the flow of new residents to the suburbs. By the end of the century, the “ideal” American home was located in a new suburb with dramatically lower densities than previously built cities and suburbs (Flint, 2005; Kain, 1967; Holleb, 1978; Churchman, 1999).

Negative associations with higher residential density stemmed from the fact that the industrialization of American cities during the 1800s and early 1900s created living conditions of overcrowding, noise, dirt, crime, poverty, disease (Pawlukiewicz, 2002; Churchman, 1999). Furthermore, urban renewal public housing projects of the 1960s and 1970s failed on many accounts, creating strong negative associations between density and the economic and social problems of depressed areas—

particularly crime. In addition, evolving cultural norms in the U.S. during the late 19th and 20th centuries contributed to increased expectations of personal privacy. This led to new zoning and building code restrictions that reduced the number of people allowed to sleep in one room of a dwelling (Pader, 2002). These cultural phenomena had significant spatial implications for housing density expectations; communities simply needed more homes for the same number of people.

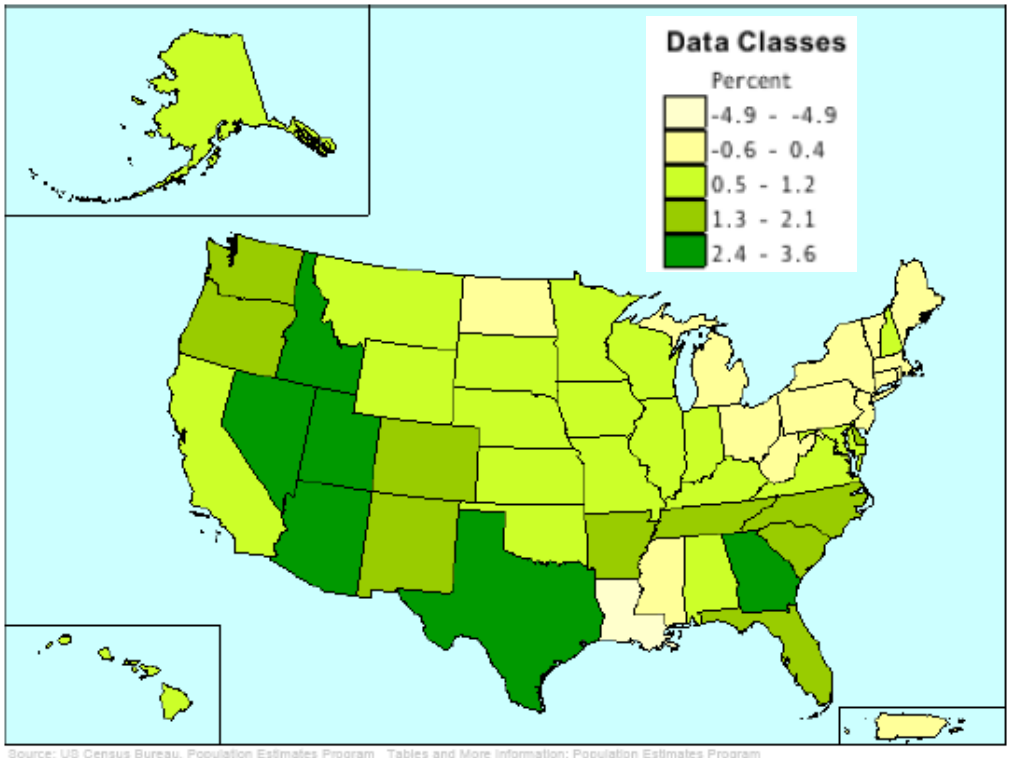
As a result of these social trends, preferences for suburban living are often deeply entrenched and unexamined. Consequently, suburbs in America may seem to many citizens, to simply be a normal part of the landscape. It may not occur to them to question spatial patterns of development. People tend to like what is familiar to them. In places that have traditionally been low density, there exists a general antipathy towards increasing densities. However, some of these areas, such as metropolitan Boston, are steadily growing. The pressures of projected population growth coupled with the fact that there is a finite amount of developable land create the impetus to conduct research that will aid in overcoming this antipathy.

Significant emerging trends point to the need to modify development patterns. These trends include demographic shifts, growing environmental awareness of the public, increased consumer demand for homes to be closer to jobs, mass transit and amenities and increased demand for green products of all sorts, including buildings. These trends are operating concurrently with the deeply entrenched preferences of low density suburbs discussed above. As a result, competing interests between community members, builders, developers, planners, designers and other stakeholders frequently arise. This study is meant to help land use professionals balance the

perspectives of community members and homebuyers with the impetus to develop more sustainably.

As seen in Figure 1.2, states that saw the largest percentage of growth from 2005 to 2006 were Idaho, Nevada, Utah, Arizona, Texas and Georgia. The U.S. will add roughly 43 million new residents by 2020 at the rate of approximately 2.7 million people per year (U.S. Census, 2008). In this context, the previous residential spatial growth patterns of low-density, leap-frog, suburban development are no longer financially or environmentally feasible. Increasing residential density is the most promising strategy for accommodating the increasing population (Haughey, 2005).

Figure 2.1: United States, Percent Change in Population from July 2005- July 2006 (Map: U.S. Census, 2008)



Even in remote areas where land is seemingly more abundant, such as the case in many parts of the states identified above as hotspots for growth, it is still a smart idea to reduce home sizes, due to the high financial and environmental costs of home heating and cooling.

Large homes built during the last two decades do not meet the needs of our changing population. In the 1950s, married couples with children accounted for the majority of household types in the U.S. As of 2000, that majority had shrunk to 24%, while the proportion of households comprised of single parents and singles or couples without children grew to 76% (U.S. Census, 2000). Many people, notably young professionals, actually eschew the conventional American Dream and prefer higher density dwellings in mixed use neighborhoods, where more vibrant cultural and social offerings are available (Flint, 2006; Haughey, 2005). Another major factor driving this trend are the aging baby boomers who no longer consider schools as a criteria for neighborhood selection, but rather, value denser, centralized locations (Steuteville, 2007; National Association of Realtors, 2004; Meyers, 2001; Schmitz, 2004). These trends indicate an increasing demand for, smaller, more affordable homes (Schmitz, 2004).

2.3 Alternative Development Models

Numerous alternative development models have emerged that address the main issues discussed thus far, which are the need for more efficient land use and reduced auto dependence. There are additional criteria for sustainable neighborhood development that are closely related because they have their own suite of potential

social and environmental benefits and contribute to the functional needs of communities with higher densities. They are:

- availability of transit choice
- walking and biking opportunities
- mixture of housing types
- affordability
- proximity to amenities and existing infrastructure
- mixture of uses (for example commercial, retail, offices and residential)
- environmentally friendly building materials and practices
- environmentally sensitive site planning and landscaping

Table 2.1, below contains brief descriptions of alternative development models. The models differ (sometimes subtly) from one another; for example (but not limited to these areas), in their emphases, what criteria are most important, how prescriptive the ideas are and in what contexts they might be most appropriate.

2.3.1 Guidelines, Standards & Assessment Tools

Attempting to create more sustainable patterns of development is complex. As a designer or developer, it can be difficult to know which materials, techniques or design components will be most effective for meeting sustainability goals. Development affects and is affected by numerous systems, such as hydrology, soils, air and human health. Therefore, scientific and professional collaboration to create consensus-based guidelines is crucial. Decision makers, planners, community

Table 2.1: Alternative Development Models

Alternative Development Models
Smart Growth Many of the following alternative development models could fall under a general heading of smart growth. It is "[w]ell-planned development that protects open space and farmland, revitalizes communities, keeps housing affordable and provides more transportation choices." (Massachusetts Executive Office of Energy and Environmental Affairs (EOEA), 2008). In addition, smart growth principles include directing development towards existing communities and infrastructure, creating distinctive communities, encouraging community and stakeholder collaboration and a fair, predictable and cost effective development process.
Neotraditional community or Traditional Neighborhood Development (TND) Residential density consistent with development in the United States from Colonial times until the 1940s. These neighborhoods encourage mixed-use, mixed housing type, compact development that facilitates efficient public services. A TND diversifies and integrates land uses within close proximity and provides for daily recreation and shopping. TNDs can be characterized as having interconnected street networks, promoting sense of civic community and appearing to have architectural nostalgia for small town Americana (APA, 2004; Southworth, 1997).
New Urbanism Can be considered synonymous with Traditional Neighborhood Development (TND) (Tu and Eppli, 1999). Emphasis on a combination of neighborhood elements that promote legibility, such as a clearly defined edge and center which includes public space, civic buildings and transit and retail (Lund, 2003). The Charter of the New Urbanism offers principles for building better communities at a hierarchy of scales from the region to the block (Congress for the New Urbanism, 2008).
Transit Oriented Development (TOD) Transit-Oriented Development is a mixed-use community within an average 2,000- foot walking distance of a transit stop and core commercial area (Calthorpe, 1993). TODs have many of the characteristics of neotraditional communities without the emphasis on controlling architectural form (Southworth, 1997).
Open Space Residential Design (OSRD)/ Cluster or conservation subdivision Subdivision design technique that concentrates buildings in specific areas on a site to allow remaining land to be used for recreation, common open space, or the preservation of historically or environmentally sensitive features (APA, 2004). "In addition to preventing intrusions into Primary Conservation Areas such as wetlands and floodplains, conservation subdivision design also protects upland buffers alongside wetlands, waterbodies, and watercourses- areas that would ordinarily be cleared, graded, and covered with houses, lawns and driveways in a conventional development" (Arendt, 1996).

members and developers need tools that help assess a development's progress at meeting goals. Industry standards for sustainable development can aid in eliminating 'greenwashing', which is the inflation or fabrication of environmental benefits for marketing purposes. To give more certainty and credibility to the sustainable development process and to give recognition to exemplary people and projects, systems of guidelines and standards and assessment tools have been developed.

Three different examples will be covered below:

1. Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) Rating System®
2. Sustainable Sites Initiative™
3. Smart Growth Scorecards
4. Massachusetts' Commonwealth Capital Policy

Certification by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System® has become increasingly recognized as the standard for high-performance, sustainable buildings. Currently in the pilot phase, the Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) rating system will soon set the standard for assessing and rewarding exemplary site selection and design. The U.S. Green Building Council has teamed up with the Congress for the New Urbanism (CNU) and the Natural Resources Defense Council (NRDC) to develop the certification criteria by which projects will be judged. The criteria are broken down into categories comprised of itemized prerequisites and credits for which points are awarded. The categories are: Smart Location & Linkage, Neighborhood Pattern & Design, Green

Construction & Technology and Innovation & Design Process. Meeting the prerequisites and various levels of points results in a project's designation as Certified, Silver, Gold or Platinum (U.S. Green Building Council, 2008).

The Sustainable Sites Initiative™, like LEED-ND, is a new effort and is currently in development. The initiative is a collaboration between the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center and the United States Botanic Garden. It consists of pilot projects and three products: Standards and Guidelines, Rating System and Reference Guide. "The motivation behind this initiative stems from the desire to protect and enhance the ability of landscapes to provide services such as climate regulation, clean air and water, and improved quality of life. Sustainable Sites™ is a cooperative effort with the intention of supplementing existing green building and landscape guidelines as well as becoming a stand-alone tool for site sustainability" (The Sustainable Sites Initiative™, 2008).

The U.S. Environmental Protection Agency has assembled eighteen examples of Smart Growth Scorecards and made them available online. Various organizations and municipalities have developed these tools to help them assess factors that affect development patterns. While the common goal is to track progress towards creating compact, mixed use, walkable developments, individual scorecards tend to be tailored to specific communities or states.

The E.P.A. has identified 3 categories of smart growth scorecards:

1. Municipal-scale scorecards help assess how the current regulatory environment (typically, a comprehensive plan and/or its zoning ordinance) influences the pattern of growth and development.
2. Project-specific scorecards help determine whether a development project meets the criteria for a community's smart growth goals.
3. Component scorecards help measure the effectiveness of certain features meant to promote goals such as compactness or walkability (U.S. Environmental Protection Agency, 2008).

Massachusetts' Commonwealth Capital Policy is a program that uses funding incentives to encourage municipalities to work with the Commonwealth on smart growth. The program rewards the implementation of planning and zoning measures that match the state's Sustainable Development Principles. To apply for Commonwealth Capital, municipalities tally points on their scorecard for zoning, planning, housing, environmental, energy, transportation, and other measures in place at the time of application and for measures they commit to implement by the end of the year. The scorecard itemizes 40 different criteria, organized into 10 categories, such as 'Zone for and Permit Compact Development,' 'Promote Clean Energy,' and 'Sustain Working Natural Landscapes.' Classified as a municipal-scale scorecard, Commonwealth Capital is also summarized on the E.P.A. website described above.

2.3.2 Evaluation

To test some of the claims of alternative development models, studies have looked at post-occupancy conditions to ascertain whether benchmarks have been achieved. Studies utilizing surveys and interviews have looked at aspects of new urbanist developments, for example testing whether they foster a sense of community by encouraging pedestrianism and social interaction (Kim and Kaplan, 2004, 2004; Lund, 2003). In similar study, of a different new urbanist development, researchers investigated the relationships between the environmental variables of town design, architecture and urban planning philosophy and a shared sense of community (Plas and Lewis, 1996).

It is essential to address critiques both to have a balanced perspective, as well as to continue to improve the design of these alternative forms of development. There are legitimate reservations that new urbanist developments will make enough of an impact on sprawl, because they have often been too small in scale, spatially isolated and built on 'greenfield'(previously undeveloped) sites. Seeing little 'urbanity' in new urbanism, some wonder if it isn't in fact, just another suburb in disguise (Southworth, 1997).

In a case study comparing Kentlands, Maryland and Laguna West, California, two new urbanist developments, researchers found that the neighborhoods' designs succeeded in creating a stronger sense of community structure and more interesting and cohesive streetscapes than conventional suburbs. However, the designs were not shown to have sufficiently integrated the developments with their surroundings or sufficiently integrated mixtures of uses within them enough to significantly reduce

automobile use. While the researchers cited design concessions to code compliance, or other constraints, the critique remains valid (Southworth, 1997).

Utilizing a survey of residents, Kim and Kaplan (2004) compared Kentlands, Maryland with a conventional suburb nearby. The residents of Kentlands indicated a significantly higher frequency of taking walks for both pleasure and to make purchases, compared with the residents of the conventional suburb. Residents of both neighborhoods rated overall layout as an important influence on the relative convenience and enjoyment of the walking environment. The researchers found that the numerous cul-de-sacs and monotonous architectural styles in the conventional suburb reduced pedestrianism, while the interconnected street network, diverse architectural styles and proximity to amenities at Kentlands encouraged pedestrianism (Kim and Kaplan, 2004).

Southworth's (1997) assessment that the layout in Kentlands, Maryland does not contribute to a significant reduction of auto use is somewhat counter to the results of Kim and Kaplan's (2004) study where pedestrian travel for pleasure and errands was reported to be significantly higher in Kentlands than in a nearby conventional suburb. The question remains, do new urbanist layouts reduce auto dependence, and if so by how much? This question is addressed in a study (Goldberg, 2007) of the relationships between land use patterns, travel behavior, and vehicle emissions in the Atlanta, Georgia Metropolitan area. Researchers found that the people who live in neighborhoods considered least walkable drive 30% more on weekdays and 40% more on weekdays than people who live in neighborhoods considered more walkable.

Seaside, Florida is a planned community which was designed to induce a sense of community. Like other new urbanist developments, Seaside included a diversity of architecture, mixed uses, active public spaces and opportunities for residents to interact. The study by Plas and Lewis (1996) found that physical design variables strongly influenced elements that define sense of community, including membership, need fulfillment, shared emotional connections and loyalty. Specific physical variables found to induce a sense of community included proximity of each home to the path network and the central public areas, a circulation and parking scheme that reduces the prominence of cars on the streets and wide porches no farther than 20 feet from the street. The study also found that this shared sense of community contributed highly to residential satisfaction (Plas and Lewis, 1996).

In some studies, it was not only neighborhood design that was shown to influence pedestrian travel and community interaction, but personal variables as well. Lund (2003) found that there is credibility to the claims that new urbanist and smart growth designs can increase pedestrian travel by combining amenities like parks and retail shops with pedestrian friendly streetscapes. Lund (2003) also found that increased pedestrian travel makes resident interaction more likely. However, personal variables, such as demographics, attitudes and perceptions were shown to have a strong influence on pedestrian travel and community interaction.

The success of new urbanist neighborhoods at meeting social and environmental goals is determined by many factors which include design variables and personal variables. Regional strategies addressing transit, density, mixed use and infrastructure can encourage the success of new urbanist neighborhoods at meeting

sustainability goals. Southworth (1997) warns that without these regional strategies, new urbanism is in danger of creating walkable enclaves within regional sprawl that do not reduce auto use or solve regional environmental or transportation problems.

2.4 Barriers to Implementing Alternative Development Models

Significant barriers to implementing alternative development models include opposition from local community members (Churchman, 1999; Haughey, 2005; Obrinsky, 2007; Pawlukiewicz, 2002; Shively, 2007), disincentives to developers (Calkins, 2004; Michigan Environmental Council, 2004; Ryan, 2006) and regulations (Levine, 2004; Michigan Environmental Council, 2004; O'Keefe, 2003). These three barriers can overlap, in other words, regulatory barriers can act as a disincentive to developers, as can perceptions that lead local community members to oppose a residential development.

Since the basis of this study is a survey of local residents' perceptions, the review of literature in this section is primarily about the barriers to implementing alternative development models that stem from issues of public perception. Therefore, although regulatory barriers in the permitting process and zoning and building codes can be formidable impediments, they will be left for another study. Additionally, in keeping with the topic of resident perceptions, the review of factors that act as disincentives to developers primarily relates to market demand, consumer preference and residential satisfaction.

2.4.1 Community Opposition

Resistance towards increasing residential densities from community members can prevent innovative projects from being built or result in plan modifications that can compromise the innovative qualities of the design. Opposition to project proposals with residential densities higher than what is typical for a town, or that are found adjacent to the proposed development site is frequently based on a fear of the unknown. Whether well-founded or not, the perception that a new development will harm a town in some way is typically the foundation to organized community opposition efforts (Churchman, 1999; Haughey, 2005; Obrinsky, 2007; Pawlukiewicz, 2002; Shively, 2007)

There are many reasons why someone may have negative associations with dense residential neighborhoods; some can be traced to common misperceptions, while other reasons stem from more legitimate concerns. Misperceptions can relate to the way people conceptualize high density. Historic trends in the U.S., which were discussed earlier have contributed to deep seated negative perceptions of dense housing because, for many years, dense housing has been associated with living conditions of overcrowding, noise, dirt, crime, poverty, disease (Pawlukiewicz, 2002; Churchman, 1999). Those conditions can, of course, still be seen in some of the Nation's dense neighborhoods; however, it would be a misconception to think that higher density always begets those conditions.

Many people who oppose increasing residential densities harbor misconceptions and outdated images of what high density actually looks like. One study found that when participants of a visual preference survey were given a choice

between two attractively designed options, a higher density community and a lower density community, a majority preferred the higher-density option" (Haughey, 2005). When people find a city or neighborhood attractive, they may underestimate its density. For example, few people would guess that Paris is approximately four times as dense as Boston (Flint, 2005).

Proponents of new urbanist developments have reported that they have experienced immediate negative reactions to the word density, despite the fact that developments of the same densities can be designed to look a variety of ways. Most Americans, when they hear the word density, picture large apartment buildings with seas of parking. When they are shown pictures of new urbanist developments, however, they find them visually appealing (O'Keefe, 2003).

Opposition to higher density residential development may stem from deep-seated and unspoken biases. There is evidence that political, race and class issues are significant components of resistance to denser housing developments. Unexpressed preferences for middle-class status, a family-centered lifestyle, or a homogeneous residential suburb may be simply expressed as a preference for single-family home ownership (Churchman, 1999). Opposition to housing based on its real impacts to the neighborhood should be distinguished from opposition to housing based on racist and classist anti-housing action, especially because they elicit different policy responses (Pendall, 1999).

Opponents' objections to dense development tend to be area specific, and directly connected to the local and regional context. Different areas tend to be more or less receptive to dense development based on the community's historic land use

patterns and socio-economic composition. For example, some researchers suggest that race and class issues related to development are more prominent in the Northeast (Flint, 2005). This classism or racism can be entwined with more legitimate concerns for safety or water quality.

Incorrect assumptions about housing needs are another common misconception that may underlie reasons for opposing higher density residential developments. Local residents may feel that few current inhabitants of suburban areas want to live in higher density developments. The notion is that the only people who have the desire to live in higher-density areas are those who live in the middle of the city (Haughey, 2005). Another common misperception which persists is that high density housing is only for low-income households, thus creating a stigma around high density development in general, and contributing to the lack of a full range of housing choices (Haughey, 2005).

A lack of awareness between land use patterns and their environmental effects is important to address because, if local residents are oblivious to this connection, they will not fully understand why they are being asked to accept higher density residential developments in their town. As discussed earlier, a strong desire to protect the rural character of growing communities in metropolitan-rural fringe regions has led some to promote large-lot residential zoning as a way to preserve character, although it is not the best way to do so (Michigan Environmental Council, 2004). Overcoming the perception that large-lot residential zoning preserves community character may be necessary for implementing alternative development models and

could require education about the connection between land use patterns and their environmental effects.

Thus far, resistance towards increasing residential densities from community members has been characterized as stemming (in part) from misconceptions. However, frequently, opponents raise arguments against denser residential developments with much more valid foundations. Legitimate concerns can often be mitigated through good design and planning, however when these concerns become proxy for unstated reasons for opposition that have classism or racism at their source, the process becomes more difficult.

Leading community concerns regarding increased residential densities relate to the perceived potential for increased costs of community services and adverse quality of life impacts. Specific areas of concern are infrastructure, including roads, sewer, water and utility lines; school finances; public safety and property values; environmental impacts, including loss of open and recreational spaces; traffic congestion, parking and safety and community character and aesthetics (O'Connell, 2003; Pawlukiewicz, 2002; Shively, 2007; Obrinsky, 2007; Churchman, 1999; Flint, 2005; Haughey, 2005).

To address concerns, such as the ones above, negotiations between developers, municipal officials and neighborhood residents during the permitting process can yield plan modifications, concessions, or "exactions." These can include impact fees for transportation improvements, off-site amenities like sidewalks and recreational amenities; open space, sometimes using a transfer of development rights agreement and/or donations to local educational and community programs (Flint,

2005, 2006). These kinds of requirements may calm the fears of local opponents; however, if requirements for community improvements are too excessive, they may deter developers from moving forward with the project.

2.4.2 Disincentives to Developers

Regulatory factors can be significant impediments to developers as they consider proposing and/ or building alternative residential development (Levine, 2004; Michigan Environmental Council, 2004; O'Keefe, 2003). However, since this study pertains to resident perspectives, the factors that are covered include market demand, consumer preferences and residential satisfaction. For developers, perceptions of potential added expenses or complications to the construction process can also deter the development of alternative development models and will be addressed.

Part of the objectives of the Green Building Practice Study undertaken in association with the American Society of Landscape Architects, was to "measure the frequency with which landscape architecture practitioners implement common ecological design strategies on their projects; determine the challenges and obstacles that, at times, contribute to non-use" (Calkins, 2004, p. 31). One of the most prevalent obstacles found was the lack of information. Therefore, it is important to provide information to developers to incentivize the use of alternative development models for new residential construction.

Showing that there is a market for sustainable developments, that they can be profitable and that there is a strong willingness on the part of enough potential

homebuyers to make trade-offs, financial or otherwise, in favor of a more sustainable residence can be incentives for builders to attempt such projects. Evidence of resident satisfaction with living in an alternative development type also bolsters the argument for market demand.

Because new urbanism, cluster subdivisions and other alternative development models are new to many builders, the time and expense of learning the new methods and approaches and then teaching them to sub-contractors can act as a disincentive. Homebuilders have more up-front costs and therefore have much at stake when taking risks with new development models.

Results from a survey of Western Massachusetts homebuilders revealed both positive and negative aspects of building cluster subdivisions or conservation subdivisions (Ryan, 2006). Cluster subdivisions are innovative because they conserve sites' natural features, while accommodating residential development. Homebuilders expressed that the advantages of cluster subdivisions include reduced infrastructure costs compared with conventional developments and the effectiveness of cluster subdivisions in preserving rural character and open space. The drawbacks homebuilders expressed include uncertainty in the development process due to requirements for special permits and skepticism of homebuyers' desire for smaller lots with houses closer together (Ryan, 2006).

2.5 Market Demand & Consumer Preference

Studies show consumer preference for neighborhoods that are walkable, offer shorter commutes, proximity to amenities like stores, parks and work (Goldberg, 2007; National Association of Realtors, 2004; Meyers, 2001; Schmitz, 2004; Steuteville, 2007). Many new urbanist consultants and developers have estimated the demand for these developments at about thirty percent of the market share (O'Keefe, 2003). However, that number has been disputed; many experts think it is too low. It could be too low because studies have typically addressed the consumer preferences of first time homebuyers, without addressing the preferences of resale buyers (O'Keefe, 2003). Adding to the confusion, are surveys where respondents say that they want a large single-family house in a suburban setting but also say that they want to live within walking distances from stores and services (O'Keefe, 2003).

Marketing plays a large role in the acceptance of a proposed or newly built development. Sometimes billed as 'Lifestyle Centers", mixed-use projects can be very trendy when they offer young professionals easy transit to urban centers and immediate amenities. Transit oriented development has become increasingly popular. Anthony Flint points out that, "New urbanist villages sell out quickly when a train station is the centerpiece amenity…Referencing the transportation in the development's name- The Village at fill-in-the-blank Station-is a prerequisite" (Flint, 2006, p. 197).

"Green" products of many sorts have been steadily increasing in their popularity over the last fifteen years. Homes are no exception. Although conventional developers may be suspicious about the financial risks of green building, it can be

profitable. Matt Greer, Chief Executive for Carlisle Development Group, a company employing green building practices, stated in a recent interview that going green adds 2% to 4% to their costs. Greer also mentions that increases between 3% and 10% have been estimated by other developers (Bright, 2007). Although it can cost more to build green, homes may be sold at a premium due to consumer demand. In fact, in a recent survey of homebuilders, 51% reported that buyers will pay a premium of 11% to 25% for green built homes. 96% of the builders that were surveyed stated that they planned to utilize more green materials and practices in the coming year, while at the time just 51% of those builders reported utilizing green materials and practices regularly. The trend towards green building is increasingly strong as developers see that they can make profits (Zweigart, 2007).

Some empirical studies have tested the theory that consumers will pay more for homes in new urbanist communities than those in conventional suburban developments. Tu and Eppli (2001) studied data on over 5,000 single-family home sales from 1994 to 1997 in three different neighborhoods. The study revealed that not only did homeowners pay a premium for homes in new urbanist neighborhoods, but that the premium was not attributable to differences in improvement age and other housing characteristics, but rather to the new urbanist features design features, such as architectural design, walkability, public open space and an enhanced sense of community. In 1999, the same researchers found that homeowners were willing to pay a 12%, or approximately $25,000, premium for properties in Kentlands (in 1999 dollars.) They showed that the premium was separate from housing-unit quality and correlated with the Kentland's new urbanist design features (Tu and Eppli, 1999).

In many locations, homebuyers are forced to buy a home in a sprawling, low density subdivision due to a lack of availability of other choices (Levine, 2004; Goldberg 2007). In a study of the relationships between land use patterns, travel behavior, and vehicle emissions in the Atlanta, Georgia metropolitan area, researchers found that there is a mismatch between people's residential environment and their stated preferences. "In all, about a third of metro Atlantans living in conventional suburban development would have preferred a more walkable environment, but apparently traded it off for other reasons such as affordability, school quality, or perception of crime in addition to lack of supply. It is likely that this mismatch between community preference and choice is due to an undersupply of walkable environments" (Goldberg, 2007, p. 10).

In the same study of the relationships between land use patterns, travel behavior, and vehicle emissions in the Atlanta, Georgia metropolitan area, a residential market survey asked respondents whether, assuming that the options were equally affordable, they would make certain trade-offs if they were shopping for a home. Fifty-five percent of respondents indicated that higher residential densities and smaller lots would be acceptable trade-offs for a shorter commute. Fifty-six percent indicated that a somewhat smaller house would be an acceptable trade-off for a neighborhood with easy options for walking, cycling or taking mass transit, as opposed to the choice of a larger house in a neighborhood that required driving to get everywhere (Goldberg, 2007).

2.6 Design Considerations for Promoting Residential Satisfaction & Mitigating Opponents' Concerns

Visual character that is compatible with a surrounding neighborhood can make a large impact on a new development's acceptance amongst local residents and perspective homebuyers (Ryan, 2002, 2006; Arendt et. al., 1994). To capitalize on this phenomenon, planners and designers must learn the specific features that local residents perceive to be contributing to their sense of the area's visual character. Studies by Ryan (2002, 2006) have investigated these issues in depth, providing insights that can be applied to neighborhood site design.

In one example, Ryan (2002) found that rural residents' response to photographed scenes of different configurations of homes was a significant preference for a scene depicting a tight cluster of homes, surrounded by lawn. Less preferred was a scene, which although from the same subdivision, showed homes arranged in a liner fashion, along the street, with wide front lawns.

In another example, Ryan (2002) and Arendt et. al. (1994) found that the use of preserved open space, such as meadows or woods to visually screen a development greatly increases the development's perceived compatibility with existing rural or low-density suburban character amongst local residents.

Investigation of residents' perceived satisfaction with living in various alternative residential neighborhoods can reveal important issues for designers, planners and developers seeking to build these types of developments. Aspects of site design that have or haven't been successful can help in formulating recommendations for the design of new neighborhoods. Overcoming opposition to a development

proposal may be easier if some of the design recommendations below are adopted and clearly communicated. For example, many of the studies in the following section illustrate how resident satisfaction can be positively affected by controlling certain design variables that reduce the perception of density.

Manipulating physical elements can radically alter the way people feel about neighborhoods because cues that inform perceived densities are at least partly independent of the actual number of people per unit area. The demands on people's attention and the level of information processing an environment requires will influence the degree of density that is perceived, however, thresholds for visual or auditory stimuli to capture one's attention will vary amongst individuals. These sensory stimuli can include physical variables such as "tight or open spaces; intricate or simple spaces; large or small building height to space ratios; numerous or few signs, lights, cars, and people (or their traces); the predominance of artificial versus natural elements or smells; high or low noise levels…and the presence or absence of nonresidential or mixed land uses" (Churchman, 1999, p. 403).

To reduce the perception of higher density, site designs should include multiple elevations and clusters of buildings with adequate spacing between them. Numerous entrances to the buildings and visual and functional accessibility from homes to open spaces also reduce the perception of high density. Using elements to buffer noise and provide for privacy can give the impression that there are fewer people in the vicinity. Well-located community services and creative parking schemes can make higher density dwellings more convenient for residents. Additionally,

access to alternative transit; sidewalks and paths and mixed-uses that encourage walking or biking can reduce traffic and the amount of parking spaces needed (Churchman, 1999). Concerns about the safety of higher density residential developments can be mitigated through better lighting plans and careful placement of buildings and landscaping to reduce opportunities for crime (Haughey, 2005).

Many visual preference studies have revealed that views of nature and easily accessible open space have been shown to contribute highly to residents' levels of satisfaction with their neighborhood, no matter what the density is (Kaplan, 2001, 2004; Kearney, 2006; Sullivan, 2006; Jorgensen, 2007). The visual quality of streetscapes and physical conditions of gardens and landscaping are variables that can symbolize the quality of a neighborhood because they express care on the part of the residents. Trees and shrubs, depending on the characteristics of the particular site, have been perceived by residents in different ways, for example, as creating privacy and seclusion, as safety hazards, as physical dangers to property and as hiding places for assailants (Jorgensen, 2007).

In order to respond to perceived market preferences and prevent opposition to a project, many designs for denser residential developments call for single-family detached homes with smaller lots so as to save land. Strategies include varying the shapes and proportions of the small lots, to increase density from a conventional seven to ten single-family homes per net hectare to seventeen to nineteen homes per hectare (Churchman, 1999).

In contrast to the recommendation of Churchman (1999) above, a study by

Day (2000) found that dwelling type was not as important to residents' level of satisfaction as other factors were. Day's (2000) study compared two new, higher-density suburban subdivisions, one of small detached houses on small lots, the other townhouses. Results showed no differences in residential satisfaction attributable to dwelling type (Day 2000). Rather, elements of the site design such as clear boundaries between private and shared spaces, visual screening with landscaping, views to vegetated open spaces and adequate automobile accommodation contributed to residents' satisfaction.

The importance of site design was highlighted in another study where aspects of satisfaction amongst residents of multi-family dwelling were ascertained through a questionnaire (Kaplan, 1985). The results revealed that the opportunity to grow plants and the availability of garden space were strong predictors of satisfaction with the respondents' community. Respondents were also asked how much they liked various views from their residences. Respondents who could not see power lines or busy streets were more satisfied with their views. Preferences ratings for views containing cars varied, indicating to the researcher that careful site design can make views of cars less objectionable. Likewise, the researcher also proposed that although nearby open space was important to resident satisfaction, its arrangement rather than its acreage, is the key variable.

Like in the study by Day (2000), ambiguity between private and shared spaces reduced residents' satisfaction (Kaplan, 1985). The skillful arrangement of open spaces, trees and natural areas can mitigate privacy issues in higher density

developments. Kaplan (1985) found that for residents of the multi-family development with more views of trees and natural areas, there were less negative feelings about the effects of people and children living nearby.

These studies indicate that, as people's preferences for neighborhoods form, they are strongly affected by the character of visual elements, especially landscaping, perhaps much more so than actual density.

CHAPTER 3

MEASURING PERCEPTIONS OF RESIDENTIAL NEIGHBORHOODS AND SUSTAINABLE DEVELOPMENT: STUDY AREA & RESEARCH METHODS

3.1 Introduction: Regional Context

The metropolitan Boston region in Massachusetts was chosen for this study because the growth pressures there are significant. The Boston Metropolitan Area Planning Council (MAPC) is the regional planning agency for 101 cities and towns across metropolitan Boston. They estimate that along with a predicted 10% growth in jobs, the Greater Boston Region could add 465,000 residents from 2000 – 2030 (Figures 3.1 and 3.2). However, they also predict that the quality of life characteristics that contribute towards population growth could be negatively impacted if certain development trends continue.

The MAPC's MetroFuture Plan promotes Smart Growth, describing it as a method to promote development, preserve open space, protect local hydrologic systems, reduce traffic, accommodate growth and promote affordable home prices. To accomplish this, regional growth will be focused in central cities, urbanized areas, near transportation nodes, and in communities with existing infrastructure. This will reduce the share of regional growth directed towards newly urbanizing locations, farms and environmentally sensitive areas (Metropolitan Area Planning Council, 2007).

Figure 3.1: Projected Job Growth
(Map: Boston Metropolitan Area Planning Council (MAPC), 2007)

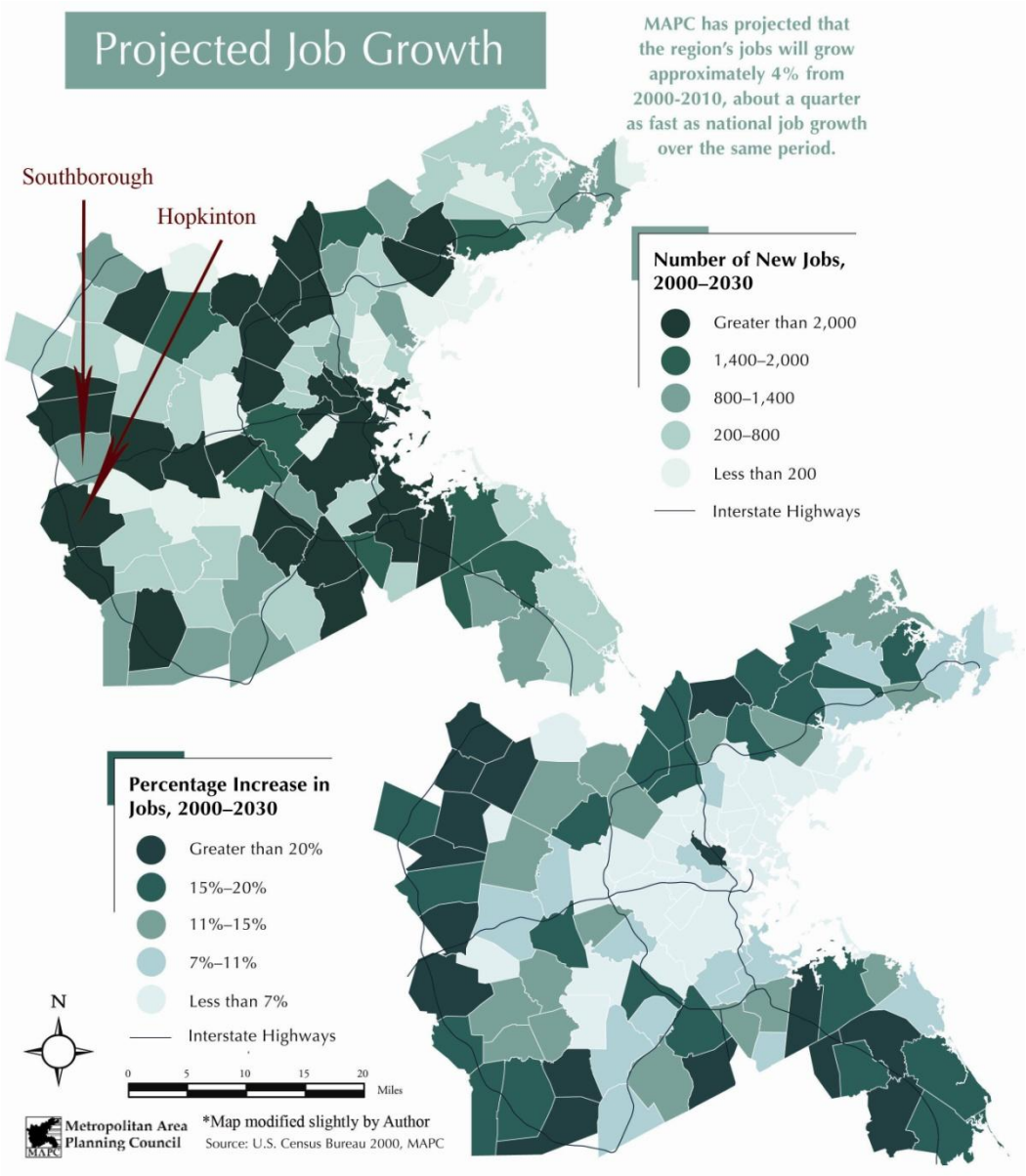
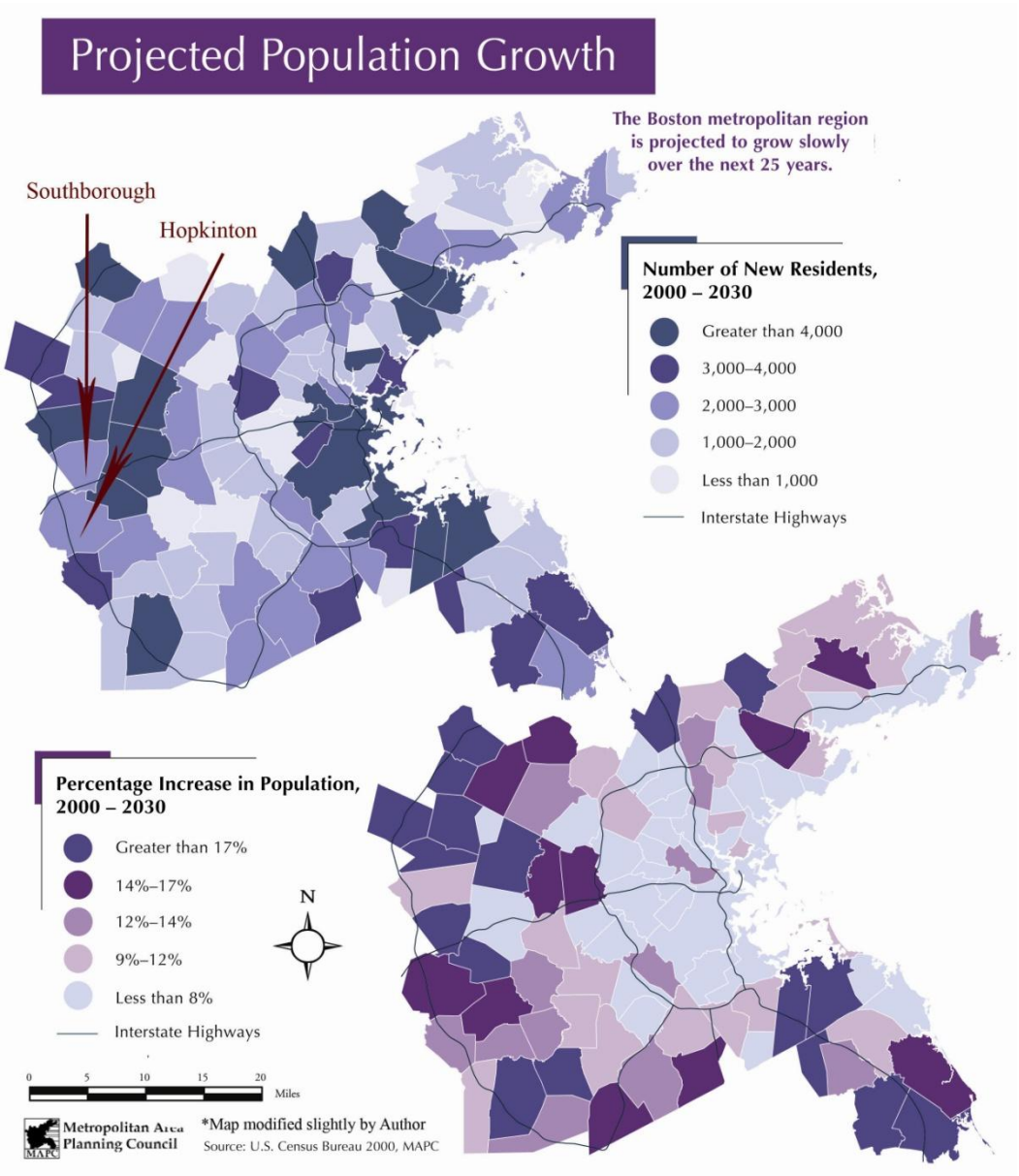


Figure 3.2: Projected Population Growth
(Map: Boston Metropolitan Area Planning Council (MAPC), 2007)



The trend within the last 20 years towards requiring larger and larger lot sizes must be reversed if more sustainable growth is to be achieved. Since there is a finite amount of developable land, accommodating predicted growth in an inefficient, sprawling pattern constitutes a threat to farms, forests and other open spaces and could exacerbate the affordable housing crisis. Failing to build enough housing near Boston pushes commuters farther and farther away, worsening traffic problems.

The established character of many towns in the region has long been rural and scenic with a history low-density residential development. This contributes to apathy and resistance towards building at greater residential densities. Some residents perceive large lot zoning as a way to preserve local character. Some perceive higher density development as antithetical to protecting the environment or out of character with their town, despite its relative proximity to Boston. Therefore, it is crucial to study local residents' desires and concerns regarding residential neighborhoods so that planners, landscape architects, policy makers and builders may propose solutions to sprawl that are acceptable to the people of Metropolitan Boston.

3.2 Study Area

Hopkinton and Southborough, Massachusetts were chosen to participate in the study because they are representative of the aforementioned characteristics of the region. Adjacent to one another, they are located a mere ~30 miles from Boston and are well serviced by road infrastructure and other services. The MetroFuture plan identifies priority areas for development and preservation. (Figure 3.3) Hopkinton and

Southborough are in one of the recommended zones for development (Metropolitan Area Planning Council, 2007).

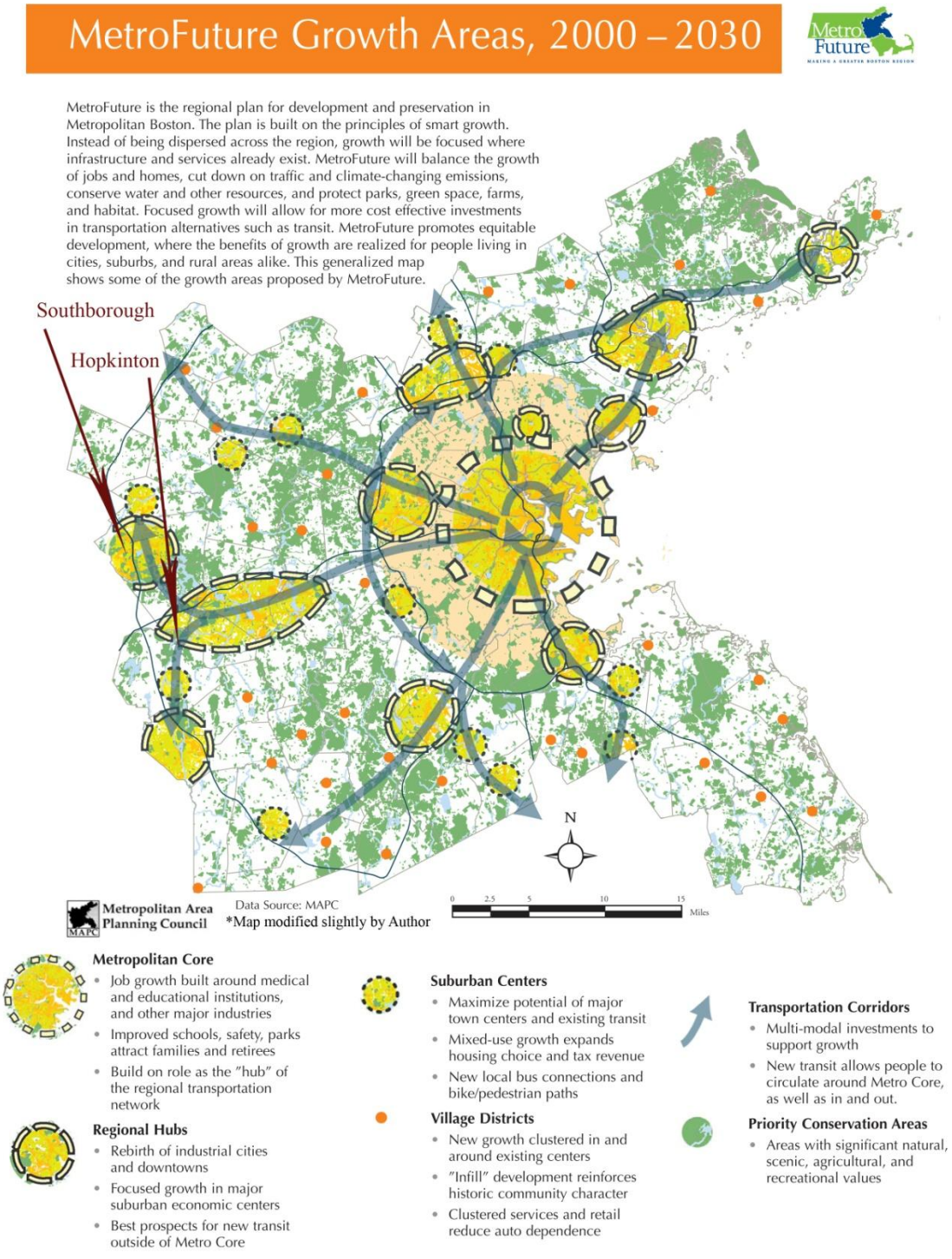
3.2.1 Hopkinton, Massachusetts

Hopkinton was chosen because of the recent, much-publicized sale of ~700 acres of Weston Nursery property. The media coverage brought development issues to the forefront and the researchers of this study thought that it might contribute to a high response rate. The proposal for the site is a development called Legacy Farms**.** As described by a local realtor, "Legacy Farms would include 940 residential units with a mix of single family homes, apartments, town-homes and condominiums. Some of the homes would also be "affordable" units under the state's guidelines for affordable housing. This venture would also include 450,000 square feet of commercial and retail space. There would be 500 acres left undisturbed" (Bill Gassett, Metrowest Massachusetts Real Estate Blog, posted 29 July 2007).

The population in Hopkinton has doubled since 1980. It was 13,346 as of the 2000 census. Many new large homes were constructed in the last decade, driving up property taxes and negatively affecting affordability. As a result, many long-time residents feel intense pressure to move (O'Connell, 2008). 43% of Hopkinton's land is still developable, with the potential to add 4,632 housing units and 12,599 people.

Approximately 76% of the developable land is zoned for 60,000 s.f. (~1.5 acre) lots. However, cluster subdivisions are allowed in those zones by special permit under Hopkinton's 1988 *Open Space and Landscape Preservation Development*

Figure 3.3: MetroFuture Growth Areas
(Map: Boston Metropolitan Area Planning Council (MAPC), 2007)



Bylaw. Since 2000, 10 cluster subdivisions have been built, preserving ~200 acres (O'Connell, 2008).

85% of Hopkinton's homes are single-family detached; the median home value for that category is about $315,000. There are 4,009 owner-occupied units and 435 renter-occupied units. 50% of renters spend more than 35% of their household income on rent. The homeowner vacancy rate is .5% and the rental vacancy rate is 3.5%. 96% of the 25+ population has graduated high school, 58% of the 25+ population has a bachelor's degree or higher.73% of the 16+ population is in the labor force. Mean travel time to work is about 35 minutes. Less than 2% of the population is below the poverty line. 60% of the population works in management, professional and related occupations; 25% of the population works in sales or office occupations. Median household income in 1999 dollars is about $90,000 (U.S.Census, 2008).

3.2.2 Southborough, Massachusetts

Located 25 miles west of Boston and 15 miles east of Worcester, Southborough is crossed by Route 9, the Massachusetts Turnpike, and Interstate 495. Adjacent to Hopkinton, Southborough has also retained a rural/ suburban character while many nearby towns have urbanized and suburbanized more rapidly. This is largely attributable to the Sudbury Reservoir and its adjacent conservation lands, which cover 25% of Southborough's land area. Single-family homes on one-acre lots have been strongly encouraged through zoning. The lack of a sanitary sewer system and soil conditions ill-suited for septic systems in some areas also encourages low-density development. Recently developed technologies may make alternative sewage

treatment options (and therefore higher densities) economically feasible. However, the business model which entails marketing higher-end homes on larger lots in wealthier communities is a common practice that may be slow to change (Southborough Housing Opportunity Partnership Committee, 2004).

Similar to Hopkinton, mean travel time to work is a half hour; 60% of residents work in management, professional, and related occupations; 25% of the population work in sales or office occupations and less than 2% of the population is below the poverty line. The median household income (in 2000) is just over $100,000. 70% of Southborough's 16+ population are members of the civilian labor force and only 1.3% are unemployed (U.S.Census, 2008).

In 2000, Southborough's population was about 9,000 and there were approximately 3,000 households. By 2030, those numbers are expected to increase to about 11,000 and 4,000 respectively (MAPC, 2008). As in Hopkinton, median home value is $315,000 and about 90% of all homes are occupied by their owners (U.S.Census, 2008). As a result, purchasing a home is out of reach for many and available rentals can be hard to find.

In 2004, Southborough's Subsidized Housing Inventory totaled 100 units, or 3.35% of the Town's housing stock (Southborough Housing Opportunity Partnership Committee, 2004). To meet and exceed the goal of 200 additional units of affordable housing by the year 2015, Southborough plans to create multi-family housing through Town initiatives and Chapter 40B projects. The town's strategies include accessory apartments (allowed by special permit since 1979), conversion of single-family homes to two-family dwellings (allowed by special permit since 1991), inclusionary

zoning, funding programs (Local Initiative Program (LIP) and Community Preservation Act (CPA) and tax relief for seniors (Southborough Housing Opportunity Partnership Committee, 2004).

3.3 Survey Instrument

The standardized questionnaire is a typical research method in environmental psychology. It is most useful when the research problem is well-defined. It offers the advantage of identifying patterns in large groups of people. Other standard environmental psychology research methods, such as, observations of physical traces or behavior, archival data analysis and focus interviews are most useful for less defined research problems, or as a precursor to developing a more specific questionnaire (Zeisel, 2006).

The survey, mailed to a sample of residents in Hopkinton and Southborough, was developed to measure residents' perceptions of residential neighborhoods and sustainable development. It was sent with a cover letter and a self-addressed, stamped envelope. A reminder postcard was mailed approximately a week and a half later. The survey instrument consists of two parts: a written questionnaire and a photo booklet with 40 black and white images showing scenes of innovative residential neighborhoods (See Appendix A: Survey and Photo Booklet). The 5-page, written questionnaire consists of a series of questions. Open ended questions were kept to a minimum, in favor of pre-coded responses to make analyzing data from a large study sample feasible. While each of the questions had pre-coded responses, opportunities

were provided for respondents to write in additional answers to and to make comments of their choosing in the space provided.

Some of the questions, such as those about neighborhood or residence type and gender offer respondents nominal, pre-coded, parallel choices. Other questions, such as those asking about the intensity of respondents attitudes towards aspects of their town, features of residential areas, environmental issues, planning approaches and possible reactions to proposed development use ordinal, pre-coded responses. The Likert attitude scale is a type of ordinal, pre-coding which was used in this questionnaire, for example as respondents were asked to rank images according to their compatibility with their part of town (Zeisel, 2006).

The questions measure respondents' attitudes about their current residential setting, community satisfaction, willingness to make trade-offs if they were shopping for a home and attitudes towards environmental issues and planning approaches. Respondents' were also asked for demographic data and descriptive data about their current residential setting. Respondents were asked to rate the photographs in the provided booklet based on the scenes' compatibility with their town's character.

The pool of "innovative" developments for inclusion in the photo booklet was generated through internet research, expert interviews and a review of standard sustainable development criteria, such as those discussed in the literature review in chapter 2 (Table 3.1). For the purposes of this study, developments were considered "innovative" if they have a minimum density of 7 units per acre and meet some of the following criteria: availability of transit choice, walking and biking opportunities, mixture of housing types, affordability and mixture of uses. Those criteria are

minimum requirements, however the actual range and amount of environmental and equity considerations incorporated in the planning and design of the seven

Table 3.1: Innovative Developments Appearing (Un- Labeled) In the Photo Booklet

Development	**Location**
The Village at Forge Pond and Washington Street Condominiums	Canton, Massachusetts
Churchill Homes	Holyoke, Massachusetts
Arborpoint at Woodland Station	Newton, Massachusetts
Battle Road Farm	Lincoln, Massachusetts
Kentlands	Gaithersburg, Maryland
Prairie Crossing	Grayslake, Illinois
Stapleton	Denver, Colorado

developments is quite significant. The 40 scenes that were chosen for the survey, out of several hundred, show a variety of features and a range of building intensities.

Determination of a development's suitability for the survey also included an evaluation of whether or not the architecture, plant palette and project type is geographically and regionally appropriate to New England. This is important because inclusion of elements such as palm trees, high rise buildings or distinctive regional architecture from outside the area could skew the compatibility ratings for people in the selected study population. There were no signs in the images that revealed the exact location, to prevent bias. Also to prevent bias, the computer program, Adobe Photoshop was used to retouch some of the photographs. This included eliminating potentially distracting markings on asphalt such as oil spills and repaired cracks. Distortion, such as a leaning light post, caused by the angle that the photograph was taken from, was also retouched.

40 total black and white images were used, eight per page. The images were randomly ordered. The survey was pre-tested with 6 people who share comparable characteristics of residents the study area. The pre-test helped to identify areas of confusion and determine how long the survey took to complete.

3.4 Survey Distribution

The survey was sent to 400 residents from Hopkinton (population 13,346 in the 2000 census) and 400 residents from Southborough (population 8,781 in the 2000 census). Addresses were acquired from property records from the town governments. The content of the surveys sent to all of the households was identical. However, the households were categorized based on neighborhood characteristics for the purposes of investigating sub-group differences in the study sample (Table 3.2). The sub-group areas are referred to as districts (not to be confused with zoning districts.) Each household falls in a base district. These districts were delineated according to the density of the neighborhood and proximity to certain features (Appendix B: Map of Districts).

Approximately one fourth of the households were also designated as part of one of two overlay districts, 'rural road/area' or 'near multi-family' (but not a multi-family household itself.) The data used to create the district boundaries included residential density information in the statewide land use layer from MassGIS, analysis of aerial photography and interviews with the town planner in each community (Vera Kolias in Southborough and Elaine Lazarus in Hopkinton.)

Table 3.2: Base Districts for Study Sample Sub-Groups

Hopkinton	**Southborough**
Hopkinton Town Center and Woodville Village center	Southborough Town Center, Fayville and Cordaville Village Centers
Multi-family	Multi-family (55+)
Low density, near Whitehall Resevoir	Low density, northern section
Medium density, near Lake Maspenock	Low density, south of rte. 90/MassPike
Low density, near Weston Nurseries	Medium density, south of rte. 90/MassPike
Medium density, near Weston Nurseries	Low density, either side of rte. 9
Low density, various locations	Medium density, either side of rte. 9
Medium density, various locations	

Of the surveys sent, 36 were returned as undeliverable, (for an effective distribution of 764 surveys), and 253 surveys were received for a 33% return rate (Table 3.3).

Table 3.3: Survey Distribution Summary

	Hopkinton	**Southborough**	**Total**
Surveys mailed	400	400	800
Effective distribution			764
Completed surveys received	132	121	253 (33%)

3.5 Study Sample Description

44% of the respondents have lived at their current address 10 years or fewer, while 56% have lived at their current address more than 10 years. Nearly 30% of the respondents have lived at their current address for more than 20 years; the average duration is 16.5 years (Table 3.4).

Table 3.4: Years at Current Residence

Years	Frequency	Valid Percent
Under 4	35	15.2
4 to 10	66	28.6
11 to 20	62	26.8
21 to 40	51	22
41 or more	17	7.4
Total	231	100

97.4% of the respondents are homeowners, which is slightly disproportionate to the percentage of homeowners for all of Hopkinton (92%) and Southborough (90%). 86.7% of the respondents live in single-family homes, with the remaining 13.3% living in apartments, condominiums and townhouses. With residence type as well, the percentage of respondents living in single-family homes is somewhat larger than the percentages town-wide in Hopkinton (81%) and Southborough (82%). Respondents who are residents of single-family detached houses have an average lot size of 1.34 acres. This does not include single-family detached residences located in cluster developments, which contain commonly-owned open space (Table 3.5).

Table 3.5: Acres at Current Residence

Acres	Frequency	Valid Percent
Less than 1	76	39.6
1-2	79	41.1
Over 2	37	19.3
Total	192	100

(Acreage shown in table limited to residents of single-family detached houses not located in cluster developments, which contain commonly-owned open space.)

Other characteristics of the respondents:

- 60% are female.
- Average age is between 40 and 49 (Table 3.6).
- Average household size is 3 people.
- Approximately half of the respondents live in households with one or more person under the age of 18.
- Average income is $50,000-$99,999, while median income is $100,000-$299,999.

Table 3.6: Age

Age	**Frequency**	**Valid Percent**
Under 20	1	0.4
20-29	4	1.7
30-39	34	14.8
40-49	68	29.6
50-59	65	28.3
60-69	37	16.1
70-79	13	5.7
80+	8	3.5
Total	230	100

3.6 Data Analysis Methods

The results of the survey were analyzed using the computer program SPSS. First, descriptive statistics, such as mean, mode, median, minimum, maximum and frequency, were used to describe the data. Then, factor analysis was used to identify patterns in the data. Factoring grouped the responses according to statistical relationships which created new categories for further analysis. The computer

program SPSS grouped the responses which were then given names by the researchers. The names of the factor categories were chosen by looking for similarities amongst the items in the groups.

The factor analysis was done with principle axis factoring, varimax rotation, eigenvalues greater than one, cases excluded pairwise and absolute values under 0.4 suppressed. Scenes that loaded on more than one factor were not included in either group that they loaded in. Internal consistency was tested and factors that had a Cronbach's coefficient alpha of .6 or higher were accepted as reliable. After the factor analysis, t-tests and one-way analyses of variance (ANOVA) were run to compare sub-group similarities and differences in the mean scores for various questions and the photograph ratings. In the t-tests, the confidence interval used was 95%. In the one-way analyses of variance (ANOVA) tests, post hoc multiple comparisons were made using the Bonferroni method. The significance level used was .05.

CHAPTER 4

MEASURING PERCEPTIONS OF RESIDENTIAL NEIGHBORHOODS & SUSTAINABLE DEVELOPMENT: SURVEY RESULTS

4.1 Introduction

Given the barriers to implementing alternative models of development discussed in the literature review, one of the main goals of the survey was to learn local residents' opinions of scenes of existing neighborhoods that were built in accordance with sustainable development principles. While there are many factors that influence the level of acceptance of a new development amongst local residents or homebuyers, visual preference can inform future decisions regarding design variables such as scale, setbacks, vegetation, layout and façades. The written questions were designed to learn how desirable certain features are, such as proximity to amenities, public parks and energy efficiency. Written questions were also designed to learn what local residents like about their town and what their concerns would be if new developments were proposed.

By 2008, local and global conditions have resulted in a generally heightened environmental awareness in the public and amongst development and land use professionals. However, efforts at sustainable development have numerous obstacles, such as time, money or lack of recognition of its value. Therefore, written questions for this survey were designed to gauge the level of value residents place on neighborhood features that promote sustainability, such as walking and biking paths. If planners, landscape architects, policy makers and builders know more about

people's desires, concerns and values, they will be better situated to promote marketable homes that support environmental and community goals.

4.2 Resident Perspectives on Hopkinton & Southborough

Nearly all of the questions on the survey asked respondents to use a 5-point scale to indicate their opinions (1=not at all, 2=a little, 3=somewhat, 4=quite a bit, 5=very much). Approximately two-thirds of the respondents (64.6%) stated that their town had changed either quite a bit (38.4%) or very much (26.2%) since they've lived there. Respondents were also asked to rate how much they have seen specific changes in their town (Table 4.1). Approximately three-fourths of the respondents (78.3%) stated that their town had become less affordable since they've lived there by indicating either quite a bit (23.3%) or very much (55%). More new houses (mean 4.27); increased traffic (mean 3.99); fewer farms, fields and woods (mean 3.79) and less open space (mean 3.62) have been changes seen by respondents. Factor analysis of the results revealed that that all answers belong in one category.

Despite these changes, natural features continue to contribute highly to what respondents like about living in their towns. For example, when asked what people like about their town, (Table 4.2) the highest rated responses were open space and natural areas (mean 4.31), many trees (mean 4.28) and rural character (mean 4.20). Learning about the qualities of these towns that are meaningful to local residents can help planners, designers, developers and other decision makers as they attempt to

Table 4.1: Perception of Specific Changes, Factor Analysis

Factor	Mean	Standard Deviation	Loading	Alpha
Specific Changes	**3.83**	**0.89**		**.887**
more new houses	4.27	.894	.777	
less affordable	4.26	1.06	.645	
increased traffic	3.99	1.08	.773	
fewer farms, fields and woods	3.79	1.23	.839	
less open space (undeveloped land)	3.62	1.14	.853	
loss of important views, landmarks or places due to development	2.96	1.22	.657	

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much
Measuring: amount of each change seen in your town)

balance the forces of change with the desire to preserve aspects of town character that are significant to residents.

Factor analysis resulted in three factored categories and five individual responses that did not factor on any category because they did not share a significant statistical relationship with the other responses. The first category, called small town, received a mean rating of 4.08. It is comprised of the four individual responses with the highest means, open space and natural areas (mean 4.31), many trees (mean 4.28), rural character (mean 4.20) and small town atmosphere (mean 4.19). The category also includes the response with the tenth highest mean, historic atmosphere (mean 3.45). The other two factored categories have two items each. The first, personal fit (mean 4.07) contains the answers feels like home (mean 4.16) and good fit with our lifestyle (mean 3.98). The second, community fit (mean 3.93) is comprised of good schools (mean 4.14) and sense of community (mean 3.70).

Table 4.2: Appreciation of Characteristics of Town, Factor Analysis

Factors	Mean	Standard Deviation	Loading	Alpha
Small town	**4.08**	**.710**		**.770**
open space and natural areas	4.31	.860	.813	
many trees	4.28	.840	.540	
rural character	4.20	.870	.816	
small town atmosphere	4.19	1.01	.532	
historic atmosphere	3.45	1.13	.481	
Personal fit	**4.07**	**.800**		**.670**
feels like home	4.16	.925	.486	
good fit with our lifestyle	3.98	.923	.626	
Community fit	**3.93**	**.920**		**.506**
good schools	4.14	1.14	.402	
sense of community	3.70	1.07	.830	
Single items (non-loading)				
neighborliness among residents	3.65	1.11		
close to work	3.45	1.39		
recreational opportunities	3.37	.860		
convenient to stores and restaurants	3.25	.840		
affordable	2.86	.870		

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much
Measuring: degree to which items contribute to liking your town)

Residents of Hopkinton and Southborough have seen many changes in their towns, some of which have been undesirable to them. Some respondents have taken steps to prevent further undesirable changes to their town. When asked if they had ever opposed a new residential development in the area where they currently live, 35% stated that they had. If the answer was ‘yes’, respondents were asked to list their reason(s) in the space provided. Following are some of the reasons given:

- ✓ "Overbuilding in town, too many oversized sterile McMansions."
- ✓ "Traffic issues, wetlands damage, overcrowding, multi-story buildings, loss of view."

- ✓ "We prefer to keep open space in the town."
- ✓ "Too dense, destroyed existing wooded area, did not fit with neighborhood and town."

(See Appendix E: Sample of Respondents' Comments for more.)

Respondents were asked to indicate the importance of various issues (Table 4.3). Nearly all of the issues were considered at least somewhat important, as indicated by mean ratings of 3.2 or higher for twelve of the thirteen responses. Furthermore, over half of the issues were considered quite a bit important, as indicated by mean ratings of 4.06 or higher for eight of the thirteen responses. Factor analysis revealed three categories of related answers and three other answers that did not factor on any category because they did not share a significant statistical relationship with the other responses.

Responses in the first category, water and energy (mean 4.48), relate to the environmental issues of water quality and quantity, recycling and energy use. Responses in the second category, preservation (mean 4.10), relate to preserving farms and slowing the rate of development in town. These categories can both be characterized as traditional approaches to environmental issues. Further reinforcing their similarity, two individual responses that also received very high ratings, dual loaded in the both categories during factor analysis. Those responses are 'preserving forests and other natural areas' (mean 4.54) and 'protecting the environment' (mean 4.43). Individually, they ranked as the second and fourth most important issues.

The third category derived by factor analysis, community planning and development (mean 3.44), contains responses about compact development, creating

affordable housing and diversifying the town's economy. The response that received the lowest ranking (mean 2.72) was 'developing more stores and restaurants in town.' It did not factor in any of the other categories.

Table 4.3: Important Issues, Factor Analysis

Factors	**Mean**	**Standard Deviation**	**Loading**	**Alpha**
Water and energy	**4.48**	**.570**		**.809**
protecting drinking water quality	4.75	.454	.472	
recycling	4.47	.767	.811	
reducing energy use	4.38	.782	.824	
conserving water	4.28	.795	.605	
Preservation	**4.10**	**.840**		**.615**
slowing the pace of residential development in town	4.13	.975	.638	
preserving farms	4.06	1.01	.534	
Community planning & development	**3.44**	**.840**		**.682**
diversifying the local economy/ tax base	3.79	1.07	.420	
promoting compact developments that protect open space	3.47	1.16	.722	
creating affordable housing in town	3.27	1.29	.573	
concentrating new residential development around existing centers	3.20	1.12	.590	
Single items (non-loading)				
preserving forests and other natural areas	4.54	.710		
protecting the environment	4.43	.680		
developing more stores and restaurants in town	2.72	1.12		

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much
Measuring: importance of each issue)

Table 4.4: Potential Concerns Related to New Developments, Factor Analysis

Factors	**Mean**	**Standard Deviation**	**Loading**	**Alpha**
Environmental	**4.11**	**0.86**		**.732**
loss of open space	4.22	.897	.637	
other environmental issues	3.96	1.03	.824	
Financial/safety	**4.03**	**0.91**		**.730**
increase in taxes	4.24	1.03	.844	
concern for my property value	4.14	.999	.582	
increased potential for crime	3.66	1.31	.555	
Appearance	**3.81**	**0.93**		**.731**
aesthetics	4.01	.933	.783	
different housing type or style than existing neighborhood	3.62	1.13	.718	
Single items (non-loading)				
traffic	4.58	1.00		
school costs	4.23	0.90		

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much
Measuring: the degree to which each item would be a concern if a new residential development was proposed in the area)

Respondents were asked to indicate the degree to which various potential impacts would be concerns, should there be a new residential development proposed in their area (Table 4.4). Nearly all of the potential impacts were indicated to be quite a bit concerning; nine of the ten received ratings of 3.96 or higher. The two individual responses that could not be factored received some of the highest ratings; traffic (mean 4.58) and school costs (4.23).

As in other questions, environmental issues were quite a bit concerning. The category of potential concerns revealed by factor analysis with the highest mean (4.11) contained answers about loss of open space and other environmental issues. The next category, financial/ safety (mean 4.03) contained concerns about taxes,

property value and crime. The third category, with responses about appearance, received the lowest rating, however at 3.81; these responses are still considered of concern to respondents.

4.3 Photo Scenes & Neighborhood Compatibility

4.3.1 Introduction

The survey asked respondents to rate 40 randomly ordered, unlabeled, black and white scenes of "innovative residential settings" according to how well the scenes fit with the character of their town. The more compatible the setting was with certain areas of their town, the higher the number that was circled on a 5-point Likert scale. Factor analysis was completed with the computer program SPSS (principal axis factoring with verimax rotation, cases excluded pairwise). Results indicated that responses to thirty of the forty images fell into five categories. Additionally, six images did not load in any category (non-loading photographs) and four photographs loaded in more than one category (dual loading photographs).

The factors were determined by loading scores >0.50, with alpha scores greater than .6 to confirm the fitness of the groups (Table 4.5). Subsequently, the researchers looked at commonalities in the photographs to name the categories:

- Open Space Dominant / Buildings in Background
- Detached, Two-Story Buildings
- Attached, Two-Story Buildings
- Mixed-Use Appearance
- Four to Five Story Residential

The categories revealed by factor analysis contain images of scenes that appear to have similar density, scale of buildings, prominence in the landscape and dwelling type. Single-family detached homes are the dominant type of residence in Hopkinton and Southborough, accounting respectively for 84.6% and 90.8% of the housing stock (U.S. Census, 2000). Therefore, it is not surprising that, as the factored categories are comprised of increasingly dense residential settings, the category means decrease.

Table 4.5: Scenes of Residential Settings, Factor Analysis

Factors/ categories	**Mean**	**Standard Deviation**	**Loading**	**Alpha**
Open space dominant / buildings in background	**3.64**	**.810**		**.837**
P37	4.03	.998	.676	
P30	3.84	.985	.740	
P17	3.77	1.20	.612	
P12	3.65	1.03	.784	
P19	3.55	1.07	.460	
P25	3.15	1.17	.503	
Detached, Two-Story Buildings	**2.53**	**.840**		**.831**
P20	3.28	1.19	.560	
P33	2.95	1.13	.731	
P36	2.57	1.14	.697	
P28	2.55	1.11	.539	
P18	2.25	1.09	.663	
P22	1.75	1.13	.418	
Attached, Two-Story Buildings	**2.40**	**.790**		**.771**
P13	2.77	1.09	.471	
P4	2.48	1.10	.668	
P5	2.44	1.19	.413	
P2	2.26	1.04	.729	
P14	1.99	.929	.475	

Table 4.5: Scenes of Residential Settings, Factor Analysis (continued)

Factors/ categories	Mean	Standard Deviation	Loading	Alpha
Mixed-use appearance	**2.10**	**0.82**		**.816**
P10	2.61	1.285	.619	
P16	2.09	1.048	.462	
P3	1.99	1.028	.486	
P27	1.94	1.026	.420	
P15	1.82	0.966	.488	
Four - five story residential	**1.57**	**0.68**		**.893**
P35	1.8	0.964	0.73	
P40	1.67	0.912	0.608	
P38	1.62	0.887	0.761	
P31	1.58	0.942	0.66	
P34	1.49	0.847	0.81	
P26	1.44	0.756	0.597	
P23	1.43	0.761	0.562	
Non-loading photographs	**Mean**	**Standard Deviation**		
P6	3.72	1.061		
P7	2.93	1.362		
P32	2.22	1.107		
P39	2.06	.949		
P8	1.30	.667		
P1	1.14	.443		
Dual loading photographs	**Mean**	**Standard Deviation**		
P11	2.69	1.141		
P9	2.27	1.035		
P24	1.71	.902		
P21	1.53	.767		

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much
Measuring: how compatible the scene is with certain areas of your town)

4.3.2 Open Space Dominant / Buildings in Background

The category, Open Space Dominant / Buildings in Background (Figure 4.1), received the highest mean rating (3.64) and appears to have the lowest density of all of the categories. In the images, the buildings are in the background, with open space

in the foreground. Only two (P19 mean 3.55 & P37 mean 4.03) of the six images contain roads. Of the other four pictures, three (P17 mean 3.77, P25 mean 3.15 & P30 mean 3.84) each feature a pathway prominently. Some amount of lawn or mown grass appears in each picture and trees and shrubs screen the view of some of the buildings, contributing to the low density appearance. The buildings appear to be single-family detached and no larger than 2-3 stories tall, also contributing to the low density appearance.

The dwelling units in all of the images in the Open Space Dominant / Buildings in Background category *appear* to be single family detached. Things are not always what they appear to be, however. One of the neighborhoods in this category is Battle Road Farm in Lincoln, Massachusetts (P37, mean 4.03, P12, mean 3.65 & P19, mean 3.55). The structures have three to four units per building, but the buildings have been carefully designed to look like rambling New England farmhouses with gabled roofs, porches and various attached outbuildings. The trompe-l'œil is effective; the six images of Battle Road Farm received the highest mean rating of the seven developments used in the survey (See Appendix C: Photos: Mean Ratings, by Development). At Battle Road Farm in addition to the architecture of the buildings, aspects of the site design were also designed to be reminiscent of classic New England style. The centerpiece of the neighborhood is a large lawn, designed to look like a classic New England village green. This was accomplished by giving the area correct proportions and using the architecture of the homes to form linear edges on the two longest sides of the rectangular lawn.

Figure 4.1: Open Space Dominant / Buildings in Background Category

Category mean: 3.64

Photo 37 Mean: 4.03
Photograph by Author

Photo 30 Mean: 3.84
Photograph by Elizabeth Brabec

Photo 17 Mean: 3.77
Photograph by Elizabeth Brabec

Photo 12 Mean: 3.65
Photograph by Author

Photo 19 Mean: 3.55
Photograph by Author

Photo 25 Mean: 3.15
Photograph by Elizabeth Brabec

4.3.3 Detached, Two-Story Buildings

The differences between the five categories identified by factor analysis indicate that housing unit type and perceived density were important elements as respondents rated the photos. One might therefore predict relatively favorable ratings for a category of images showing smaller single family detached homes at densities that are represented in Hopkinton and Southborough. However, as seen with the second category (Figure 4.2), this was not necessarily the case.

This category, called Detached, Two-Story Buildings, did receive the second highest mean rating, however at 2.53, the images were only rated between 'a little' and 'somewhat' compatible with the character of Hopkinton and Southborough. The images show neat rows of modest sized homes (appearing to vary from approximately 1,500 -3,000 square feet). Given the size of the homes, the lots are likely about one-quarter to three-fourths of an acre, a lot size represented in Hopkinton and Southborough. 26.6% of the survey respondents living in single-family residences, (not in cluster developments) reported their lot size to be less than three-fourths of an acre. Additionally, about one-third of the housing stock in Hopkinton (36.1%) and about one-half of the housing stock in Southborough (47.1%) was built prior to 1970, when lot sizes were generally much smaller (U.S. Census, 2000).

Similar elements seen in each photograph in the category include sidewalks, picket fences and porches. The most striking difference amongst the group is that four of the six images contain trees and shrubs, while the two images that received the lowest ratings (P18 mean 2.25 & P22 mean 1.75) have almost no visible vegetation, especially P22, which received a very low rating, especially when

Figure 4.2: Detached, Two-Story Buildings

Category mean: 2.53

Photo 20 Mean: 3.28
Photograph by Elizabeth Brabec

Photo 33 Mean: 2.95
Photograph by Elizabeth Brabec

Photo 36 Mean: 2.57
Photograph by Author

Photo 28 Mean: 2.55
Photograph by Author

Photo 18 Mean: 2.25
Photograph by Elizabeth Brabec

Photo 22 Mean: 1.75
Photograph by Author

compared with the top ranked photo in the group, (P20 mean 3.28). In the top ranked photo, the buildings are obscured by vegetation more than in any of the other scenes.

4.3.4 Attached, Two-Story Buildings

The third category of images (Figure 4.3) derived from factor analysis, attached, two-story, received a mean rating of 2.40. Respondents indicated that scenes in this category were between a little and somewhat compatible with certain areas of their town. Some of the images show signs of multi-family dwelling units, such as shared drives, shared parking and attached buildings. Trees, shrubs and lawn appear but are not dominant features; as their relative prominence in each photograph goes down, so did the ratings.

Many new urbanist designs place parking in the back of buildings to allow the space in the front of buildings to be used for a pedestrian-friendly realm that encourages walking, biking and social interaction. In such designs, the streetscape is defined by sidewalks, shallow front yards and porches rather than long driveways, large set-backs and big garages. These design techniques were used in the neighborhoods shown in images P5, P2 and P14 in this category. The two images with the lowest ratings, (P2 mean 2.26 & P14 mean 1.99) show the back sides of the homes, where parking has been sited, while the other image (P5 mean 2.44) received a higher rating and shows the front of homes and a new urbanist style streetscape.

Figure 4.3: Attached, Two-Story Buildings

Category mean: 2.40

Photo 13 **Mean: 2.77**
Photograph by Author

Photo 4 **Mean: 2.48**
Photograph by Author

Photo 5 **Mean: 2.44**
Photograph by Elizabeth Brabec

Photo 2 **Mean: 2.26**
Photograph by Author

Photo 14 **Mean: 1.99**
Photograph by Elizabeth Brabec

4.3.5 Mixed-Use Appearance

This category (Figure 4.4) received a mean rating of 2.10. It is comprised of images that appear to be of mixed-use developments. The buildings look as though they are three or four stories, with retail establishments at the street level and apartments and offices above. The downtowns and village centers of Hopkinton and Southborough do contain buildings with similar arrangements of uses, however as the architecture is quite historic, it does not resemble the scenes in the photographs.

Four of the five images are, in fact of mixed-use developments. The image (P16 mean 2.09) that is not of a mixed-use development is from Arborpoint at Woodland Station in Newton, Massachusetts. It is a transit-oriented development of luxury apartments. The location directly adjacent to the Woodland Commuter Rail Station is a key part of their image. As such, the design of the façade at the main entrance is reminiscent of a train station, which may be why people perceived it similarly to the actual mixed-use developments. The image (P10 mean 2.61) with the highest mean rating contains a few amenities that do not appear in the other images, including outdoor café seating, a clock and a prominent streetlamp.

There are trees in each image, however they are young trees. Young trees are smaller and therefore these images contain a smaller amount of noticeable vegetation than other images used in the survey. Additionally, young trees give the impression of a newer development, which indicates changes in the community where it is located. Mature vegetation connotes permanence and can give the impression that a development is part of the established character of a town.

Figure 4.4: Mixed-Use Appearance

Category mean: 2.10

Photo 10 **Mean: 2.61**
Photograph by Author

Photo 16 **Mean: 2.09**
Photograph by Author

Photo 3 **Mean: 1.99**
Photograph by Author

Photo 27 **Mean: 1.94**
Photograph by Author

Photo 15 **Mean: 1.82**
Photograph by Elizabeth Brabec

4.3.6 Four to Five Story Residential

Images in this category (Figure 4.5) received the lowest mean rating (1.57). Respondents found these scenes to be least compatible with the character of their town, which is not too surprising, given the dearth of similar settings in Hopkinton and Southborough. This category contains the tallest buildings in the set of photos, which may have given the impression of a high-density, urbanized neighborhood. Trees, shrubs and lawn appear but are not dominant features. As in the previous category, many of the trees appear immature or newly planted.

4.3.7 Individual Photographs

During factor analysis six images (P6, P7, P32, P39, P8 and P1) did not load in any category (Non-Loading Photographs, Figure 4.6) and four photographs (P11, P9, P24 and P21) loaded in more than one category (Dual Loading Photographs, Figures 4.7). Therefore, these ten photos were not included in subsequent analysis, unless looked at as individual images with mean compatibility ratings.

In addition to the categories that factor analysis revealed, individual mean ratings reveal other trends. The rankings for all 40 images (Appendix D: Photos: Mean Ratings, from Highest to Lowest), indicate that the presence of vegetation and especially, mature vegetation, made a big difference. The 7 images (P37, P30, P17, P6, P12, P19 & P20) with the highest rankings (4.01-3.26) contain mature vegetation, occasionally with younger vegetation as well. Analysis of the 11 images (P24, P22, P40, P38, P31, P21, P34, P26, P23, P8 & P1) that received the lowest rankings (1.71-1.14) reveals either no vegetation or very young trees in the bottom.

Figure 4.5: Four to Five Story Residential

Category mean: 1.57

Photo 35 Mean: 1.80
Photograph by Author

Photo 38 Mean: 1.62
Photograph by Elizabeth Brabec

Photo 34 Mean: 1.49
Photograph by Author

Photo 40 Mean: 1.67
Photograph by Elizabeth Brabec

Photo 31 Mean: 1.58
Photograph by Elizabeth Brabec

Photo 26 Mean: 1.44
Photograph by Author

Photo 23 Mean: 1.43
Photograph by Author

Figure 4.6: Non-Loading Photographs

Photo 6 **Mean: 3.72**
Photograph by Elizabeth Brabec

Photo 7 **Mean: 2.93**
Photograph by Elizabeth Brabec

Photo 32 **Mean: 2.22**
Photograph by Elizabeth Brabec

Photo 39 **Mean: 2.06**
Photograph by Author

Photo 8 **Mean: 1.30**
Photograph by Author

Photo 1 **Mean: 1.14**
Photograph by Author

Figure 4.7: Dual Loading Photographs

Photo 11 Mean: 2.69
Photograph by Author

Photo 9 Mean: 2.27
Photograph by Elizabeth Brabec

Photo 24 Mean: 1.71
Photograph by Elizabeth Brabec

Photo 21 Mean: 1.53
Photograph by Author

Compelling discoveries were made through analysis of the content and mean compatibility ratings of individual images, P6 (non-loading), P17 (Open Space Dominant / Buildings in Background) and P28 (Detached, Two-Story Buildings). As explained in greater detail below, these three images show non-traditional landscaping yet had surprisingly high ratings. Perspectives of another individual image, P8 (non-loading) are also compelling and are discussed in a later section of this chapter that looks at group differences in survey responses.

Each of the seven neighborhoods that were chosen for this study is an exemplar of sustainable development; however no two are exactly alike. In each project, specific environmental and social goals varied as well as the suite of measures undertaken in hopes of meeting those goals. For example, while Arborpoint in Newton, Massachusetts excels for its location at the Woodland Commuter Rail Station, the luxury apartments are quite a contrast to Churchill Homes in Holyoke, Massachusetts. Churchill Homes is a Hope VI, affordable housing development comprised of 272 energy- and resource-efficient townhouses and flats, arranged in a new urbanist layout. (For photo numbers and ratings organized by development, see Appendix C: Photos: Mean Ratings, by Development.)

One of the innovative features at Churchill Homes is the community garden. Community gardens have numerous environmental, social and individual benefits, especially for people with lower incomes. However, it is not unusual to have issues with community gardens, including neighbors that perceive the visual character of the garden as messy and complain to gardeners and/ or municipal officials. Consequently, it was refreshing that the image (P28) of Churchill Homes with the community garden prominently displayed in the foreground received a mean rating of 2.53. It was ranked 16th out of the 40 photos in the booklet.

The other case of non-traditional landscaping with surprisingly high ratings is from Prairie Crossing in Grayslake, Illinois. Prairie Crossing, an award winning "Conservation Community," excels in the areas of environmental protection and enhancement, recreation and gardening opportunities, energy conservation and transit choice. One of the key design components is a natural swale conveyance system for

stormwater management and extensive use of native prairie plant species. These components eliminate or greatly reduce the ecological and social damage that can occur in conventional developments from run-off, pollutants and flooding. The tall meadow species have higher habitat value than turf grass and require a fraction of the maintenance (Apfelbaum, 1995).

Landscapes that provide ecological functioning, such as tall meadow grass, can be perceived as 'messy.' This perception can lessen the perceived value of those spaces. By providing an 'orderly frame' around the 'messy ecosystem' (such as a mown strip around the edge), this acts as a 'cue to care,' communicating value to the residents (Nassauer, 1995). This technique is visible in photos P6 and P17 of Prairie Crossing.

The Prairie Crossing community is supportive of ecological landscaping. However, throughout America well-intentioned people have run up against major obstacles as they have attempted to implement turf alternatives. These obstacles include intolerant homeowners associations, municipal code enforcement agents and neighbors that do not appreciate the visual character of ecological landscaping (Ingram, 2001).

Image P17 shows a path with tall meadow grass on either side, a mown edge and homes in the distance. This image received a remarkably high rating of 3.76, placing it near the top of all images shown; as the 3rd most compatible image out of 40. The presence of tall grass along a trail, however, is not nearly as likely to be as objectionable to neighbors as a swale with tall meadow grass in the front yard of a home. This is what makes the reaction to image P6 so surprising and encouraging.

With a mean rating of 3.72, this image, which prominently features a non-traditional looking, ecological landscape, actually received the 4th highest rating.

4.4 Perceptions of Residential Neighborhoods & Sustainable Development

4.4.1 Preferred Features

Respondents answered written questions about residential neighborhoods that were not specific to their town or to images in the photo booklet. The intent of these questions was to learn about respondents' most and least preferred residential settings, their attitudes towards sustainable development and whether or not they would make certain choices if they were shopping for a home. This knowledge is essential for accommodating growth with marketable, context-sensitive developments that address today's pressing environmental and social issues.

Evidence of respondents' strong appreciation of nature continued to be a prominent theme. When asked how important various features are for residential neighborhoods, (Table 4.6) answers such as 'street trees,' 'landscaping,' and 'views to nature and preserved natural areas' all received mean scores over 4.18. Respondents had favorable views of nearly all of the features of residential neighborhoods that they were asked to rate. Factor analysis revealed six categories of answers, which were subsequently given titles to reflect their commonalities.

Table 4.6: Important Features for Residential Neighborhoods, Factor Analysis

Factors	Mean	Standard Deviation	Loading	Alpha
Aesthetics	**4.36**	**.720**		**.723**
aesthetically pleasing buildings	4.42	.725	.643	
street trees	4.31	.860	.639	
Calm and scenic	**4.23**	**.610**		**.754**
privacy	4.31	.767	.746	
quiet, low traffic streets	4.29	.756	.661	
landscaping around homes/ buildings	4.19	.825	.605	
views to nature and other open space from home	4.18	.837	.595	
Environmentally sensitive	**3.90**	**.760**		**.640**
preserves natural areas (i.e., woods, streams, wetlands)	4.49	.749	.469	
environmentally friendly building materials and practices	3.86	1.05	.744	
shared common areas (i.e., open space, recreation areas)	3.33	1.14	.539	
Housing diversity	**3.67**	**.740**		**.542**
affordable	4.00	.989	.420	
mixture of housing types	3.51	.965	.642	
varied building styles and sizes	3.46	1.03	.546	
Enhances mobility	**3.66**	**.760**		**.627**
walking and biking paths	4.01	.952	.530	
nearby transit (public transportation)	3.52	1.07	.606	
convenient shopping/ dining opportunities	3.48	.990	.531	
Layout	**2.86**	**.860**		**.576**
connected to existing neighborhoods	3.20	.943	.679	
compact neighborhood layout	2.52	1.06	.512	
Single items (non-loading)				
safe	4.86	.430		
nearby parks and open space	4.23	.810		
serviced by town water and sewer	3.66	1.05		
large yards	3.58	1.21		

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much.
Measuring: importance of each feature for residential areas)

The first two categories, both considered between quite a bit and very important, relate to the importance of a neighborhood's visual character. Aesthetics, the category with the highest mean (4.36) contains the responses 'aesthetically pleasing buildings' and 'street trees.' The second group of features (mean 4.23) relate to calm and scenic qualities which are 'privacy,' 'quiet, low traffic streets,' 'landscaping around homes/ buildings' and 'views to nature and other open space from home.' The importance of environmental issues has been a theme throughout the survey and continues with the third category of this question, which received a mean ranking of 3.90 for environmentally sensitive features ('preserves natural areas,' 'environmentally friendly buildings,' 'shared open space and recreation areas.')

With means of 3.67 and 3.66, the fourth and fifth categories were not rated much lower than the third, or much different from each other. These categories contain features related to housing diversity ('affordable,' 'variety of building types, styles and sizes') and enhanced mobility ('paths' and 'convenient public transit/ shopping/ dining'). As categories, they rank between somewhat and quite a bit important. The sixth category, containing responses about compact and connected neighborhood layouts, was least important to respondents (mean 2.86).

4.4.2 Open Space Protection & Compact Development

Intensifying development in one's community may seem antithetical to protecting open space, but in fact, they can be thought of as opposite sides of the same coin, or perhaps, strange bedfellows. Developable land is a finite resource; as it

becomes increasingly scarce, the bond between open space protection and compact development becomes increasingly important. In metropolitan Boston, accommodating predicted population growth at the conventional density of one household per acre severely limits communities' options for open space protection.

On the other hand, preserved open space is not guaranteed simply because densities are increased elsewhere, further complicating this important relationship. While planners, landscape architects, state and municipal officials, developers and other land use professionals routinely need to comprehend the spatial aspects of land use and its environmental effects, the general public does not. Potentially negative outcomes can result from such a mismatch in awareness and understanding, such as a lack of public support for planning efforts.

While municipal planning efforts that address the relationship between compact layouts and preserved open space are evident in Hopkinton and Southborough (for example, their Open Space Zoning Bylaws), results from this survey seem to indicate a deficiency in the understanding of this relationship amongst respondents. For example, while the response 'preserves natural areas (i.e., woods, streams, wetlands)' received the second highest rating of importance as a feature of a residential neighborhood (mean 4.49, or between 'quite a bit' and 'very much important'), the feature 'compact neighborhood layout' received the lowest rating of importance out of the 21 total choices (mean 2.52).

Looking at the response 'preserves natural areas (i.e., woods, streams, wetlands)' again and comparing it with the mean for 'large yards' which is 3.58, (or

between ‘somewhat’ and ‘quite a bit important’) is compelling. Although preserving natural areas was given a higher rating than large yards, respondents rated both items as important features for residential neighborhoods. Depending on the scarcity of land in a given area, it may be unfeasible to sustainably accommodate both land uses.

Two of the questions on the survey were very similar, with one key difference. As respondents rated the importance of various issues, one of the choices was ‘promoting compact developments that protect open space.’ When they were asked to rate the importance of various features of residential neighborhoods, one of the choices was ‘compact neighborhood layout.’ In the first example, where protecting open space was given as the rationale for promoting compact development, responses were significantly higher, with a mean rating of 3.79, versus the mean rating of 2.52 for ‘compact neighborhood layout’ with no mention of preserving open space. This example suggests to planners that support for their efforts hinges on how well they communicate the rationale for their decisions, plans and programs.

Evidence of respondents’ strong appreciation for open space, views to nature, wetlands, farms and forests is found throughout their answers to survey questions. However, support was less strong for strategies that may aid in the protection of these areas, such as compact development and concentrating new development around existing town centers (Table 4.7).

Table 4.7: Strong Support for Open Space Protection, Weak Support for Compact Development, Comparison of Means

Open Space Protection		**Compact Development**	
Important Features	**mean**	**Important Features**	**mean**
Preserves natural areas (i.e., woods, streams, wetlands)	4.49	Compact neighborhood layout	2.52
Important Issues		**Important Issues**	
Preserving forests and other natural areas	4.54	Promoting compact developments that protect open space	3.79
Slowing the rate of development in town	4.13	Concentrating new residential development around existing centers	3.20
Preserving farms	4.06		

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much. Measuring: importance of each feature and issue)

This study suggests that the discrepancy in the level of support for open space protection and compact development is related to a lack of awareness of the spatial aspects of land use and its environmental effects. It seems that respondents may be unaware that preventing development in one area results in a local or regional redistribution of growth pressures. However, future testing would be needed to more precisely determine the nature of these issues. For instance, respondents may have an understanding that compact developments can make land preservation more feasible and at the same time do not think that promoting developments of any kind is important because their town does not need any new development.

4.4.3 Effects of Additional Information on the Photo Ratings

This study was designed in part to learn the degree to which respondents value various aspects of sustainable development. As the respondents were rating the images, they were responding to the limited amount of information that a photograph can convey. They had little way of knowing, for instance, if a development was or was not built in accordance with sustainability or equity principles. Therefore, the photo ratings alone cannot answer whether people perceive the application of such principles to development practices as an added value. Will future proposals for new developments in Hopkinton, Southborough or other communities throughout metropolitan Boston be better received if they included more components of sustainable development?

To investigate these issues, a question was added to the survey directly following the photo rating segment. It asked respondents whether they would rate the photographs differently if they had known certain things about them. The added information that respondents were asked to consider relates to successfully meeting sustainability benchmarks (Table 4.8). The scale that respondents were instructed to use for this question was slightly different than the scale used in the other questions, although values were still represented as numbers between 1 and 5. A response of 3 indicates that a respondent would keep the photo ratings the same, despite the new information. The mean rating for all five items is 3.57, indicating that these issues

would have little impact on their perceptions of compatibility. Each item received a rating in the mid-range, from 3.27 at the low end to 3.97 at the high end.

Table 4.8: Impact of Additional Information on Compatibility Ratings, Factor Analysis

Factors	**Mean**	**Standard Deviation**	**Loading**	**Alpha**
Additional information	**3.57**	**.650**		**.880**
preserves existing trees and open space	3.97	.820	.742	
used environmentally-sensitive site planning to protect nearby streams and wetlands	3.83	.815	.819	
energy efficient homes	3.73	.814	.794	
certified by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™	3.50	.869	.767	
built with environmentally friendly building materials (e.g., recycled products)	3.44	.812	.799	
received a national or state Smart Growth Award	3.32	.855	.582	
located near existing transit stops	3.30	.873	.608	
included some homes that were affordable to low-income residents	3.27	1.01	.494	

(Scale: 1 =much lower 2 =a little lower 3 =the same 4 =a little higher 5=much more
Measuring: how differently photos would have been rated with additional information)

The added information that would have made some impact on respondent's compatibility rating of the photos was, 'preserves existing trees and open space' (mean 3.97) and 'used environmentally-sensitive site planning to protect nearby streams and wetlands' (mean 3.83) and energy efficiency (mean 3.73). Items related to recycled materials (mean 3.44) and proximity to transit (mean 3.30) made little impact. Neither did third party recognition in the form of certification (mean 3.50) or

an award (mean 3.32). Inclusion of some homes affordable to low-income residents (3.27) was least likely to influence perceptions of the projects in the photographs.

4.4.4 Willingness to Make Trade-Offs

Throughout the questionnaire, responses in favor of protecting the environment received very favorable ratings. The question remained, however, how willing were respondents to make certain trade-offs for more environmentally friendly neighborhood features, should they be shopping for a new home?

Respondents were asked how willing they would be to trade a large yard or pay up to 20% more for some typical features of sustainable development (Table 4.9). On the scale of possible responses that was provided to indicate degree of willingness to make certain trade-off s, a '3' indicates being somewhat willing and a '2' indicates being a little willing. All seven questions received mean ratings between 3.15 and 2.53, indicating a generally low level of willingness to make the given trade-offs.

In every instance, the trade-offs that asked people to give up a large yard in exchange for something more sustainable received slightly higher ratings than the trade-offs that asked people to spend up to 20% more on a home in exchange for something. The trade-offs people were most willing to make were a large yard for environmentally friendly site design (mean 3.15) and a large yard for common open space (parks and natural areas). The trade-offs people were least willing to make were pay up to 20% more for a more central location (mean 2.53) and pay up to 20% more for green building materials and practices (mean 2.81).

To see if income was related to people's willingness to make the set of trade-offs involving added expenditures for certain features, a t-test was run. Surprisingly, there was no remarkable difference in willingness to pay amongst people who responded that their household income was over $300,000 (mean 2.63); versus people who responded that their household income was under $300,000 (mean 2.61).

Table 4.9 Trade-offs in Selecting a Home, Factor Analysis

Factor	**Mean**	**Standard Deviation**	**Loading**	**Alpha**
Willing to trade a large yard for…	**3.03**	**1.16**		**.863**
environmentally friendly site design	3.15	1.27	.740	
common open space (parks and natural areas)	3.09	1.28	.922	
a location within walking distance of schools, stores and restaurants	2.97	1.40	.753	
shorter commute time	2.84	1.48	.735	
Willing to pay up to 20% more for…	**2.80**	**1.06**		**.767**
pedestrian friendly/ walkable	2.97	1.33	.818	
green building materials and practices	2.81	1.24	.546	
a more central location	2.53	1.19	.826	

(Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much. Measuring: willingness to make trade-offs)

4.4.5 Environmental Values and Choices

This section compares certain results reported earlier in this chapter to investigate whether survey participants matched their stated level of environmental ideals with responses to questions based on choices or actions that could support those environmental ideals. In the following two comparisons, environmental values were measured with questions about the importance of various features for residential neighborhoods, the importance of various issues and potential concerns related to new

developments; while environmental choices or actions were measured with questions about willingness to make trade-offs for some typical features of sustainable development and the impact that additional information about meeting sustainability benchmarks would have had on respondents' ratings of the photographs. Nearly all of the answers that reflect environmental values were considered quite a bit important to respondents (indicated by mean >3.9). However, results found a generally low level of evidence that these strong environmental values were translated into a willingness to make choices that would support these values. The tables below (4.10 and 4.11), compare issues related first to site design and second, to energy use.

Table 4.10: Strong Support for Environmental Values, Weak Support for Environmental Choices: Site Design, Comparison of Means

Environmental Values	**Mean**
Important features for residential neighborhoods	
preserves natural areas (i.e., woods, streams, wetlands)	4.49
Important issues	
protecting drinking water quality	4.75
Potential concerns related to new developments	
loss of open space	4.22
Environmental Choices	**Mean**
Willingness to trade a large yard for…	
environmentally friendly site design	3.15
common open space (parks and natural areas)	3.09
Impact of additional information on ratings	
preserves existing trees and open space	3.97
used environmentally-sensitive site planning to protect nearby streams and wetlands	3.83

(Mean scores based on a Likert scale, features, issues and concerns: 1= not at all important, 5= very important; tradeoffs: 1= not at all willing 5= very willing; impact of additional information on photos: 1= would have rated the photos much lower 5= would have rated the photos much higher)

Respondents rated preserving natural areas, protecting water quality and concern for potential losses of open space due to development as quite a bit, to very important. Certain strategies have been used to address these three items, including environmentally friendly neighborhood site design that protects nearby streams and wetlands, preserves existing trees and open space and designation of common parks and natural areas. These considerations are often made possible with neighborhood design that reduces the size of yards for individual homes, utilizing the land savings to meet environmental and social/recreational goals. Support for these strategies was lukewarm and did not match the level of importance that was indicated for the corresponding environmental values. Respondents were somewhat willing to make the trade-offs and would have rated the photographs only slightly or a little higher.

The chart below compares the issue of reducing energy use, which respondents indicated to be quite a bit important, with several choices commonly made in order to reduce energy use. Several of the choices have additional benefits, such as increased physical activity which, in addition to personal health benefits, has been shown to increase instances of social interaction (Lund 2003). Respondents were between a little and somewhat willing to make the trade-offs and would have rated the photographs only slightly higher.

These findings reveal a chasm between people's ideals and the effort they feel they can give to their realization. It is an aspect of many areas of life that is, perhaps, felt universally. It is easy enough to say that an issue is important. It is harder to try to fix it, if it means personal sacrifice or the solution is unclear. What motivates someone to change their ways of thinking or acting, especially when it means

Table 4.11: Strong Support for Environmental Values, Weak Support for Environmental Choices: Energy Use, Comparison of Means

Environmental Values	**Mean**
Important issues	
reducing energy use	4.38
Environmental Choices	**Mean**
Willingness to trade a large yard for…	
a location within walking distance of schools, stores and restaurants	2.97
shorter commute time	2.84
Willingness to pay up to 20% more for…	
pedestrian friendly/ walkable	2.97
green building materials and practices	2.81
a more central location	2.53
Impact of additional information on ratings	
energy efficient homes	3.73
built with environmentally friendly building materials (e.g., recycled products)	3.44
located near existing transit stops	3.30

(Mean scores based on a Likert scale, issues: 1= not at all important, 5= very important tradeoffs: 1= not at all willing 5= very willing; impact of additional information on photos: 1= would have rated the photos much lower 5= would have rated the photos much higher)

sacrificing a measure of convenience, money, time or something else? Respondents may appreciate sustainable development as a concept but be disconnected to its applications, processes and methods, especially those outside of development-oriented professions. This finding indicates a need (on individual and societal levels) for greater of awareness of the discrepancies between environmental ideals and actions and the need for professionals in related positions to provide more opportunities for people to be able to make choices that reflect their values.

4.5 Group Differences in Perceptions of Photo Scenes & Neighborhood Compatibility, Residential Neighborhoods & Sustainable Development

4.5.1 Introduction

The data analysis in the previous sections provides new insight into the perceptions of local residents, which can be applied towards addressing the region's development issues. Several key themes have emerged, for example, people's appreciation for nature and environmental values. The small, rural and historic qualities of these towns contributes very much to what residents like about living there and low density patterns of residential development are perceived as more in keeping with those qualities.

To gain further insight and make more sophisticated distinctions about themes related to people's perceptions of residential neighborhoods and sustainable development, several t-tests were completed. One of the goals of performing t-tests is to see what characteristics define groups that rated the various categories of photographs as more or less compatible. While most local residents preferred images of residential neighborhoods that appeared to have lower densities, some local residents gave the residential neighborhoods that appeared to have higher densities higher ratings. Were these higher ratings based solely on whether the scene looks visually compatible with certain areas of their town, or were there other factors that resulted in higher ratings (such as visual cues indicating that a neighborhood was built with principles of smart growth and sustainability?) Did respondents who

indicated support for sustainable development in the written questions give these photos higher ratings?

4.5.2 Favorable Perceptions of Sustainable Development, Smart Growth & Higher Densities

Patterns in the responses to written questions and photo ratings reveal that that higher densities, smart growth and sustainable development are favored by a sub-set of the respondents. The written portion of the survey was designed to gauge, amongst other things, perceptions of specific characteristics that are typical of neighborhoods built in accordance with smart growth and sustainable development goals. This was done by including certain items in the list of features and issues that respondents were asked to rate. Comparing the ranking of those items with groups that perceived the four higher density categories of photographs as either more or less compatible, reveals keen insights. Further insights are found by comparing the same groups with additional questions that measured support for sustainable development. These questions asked how willing respondents would be to trade a large yard or pay up to 20% more for some typical features of sustainable development and how differently they would have rated all of the photographs, had they known the developments had been designed to meet sustainability benchmarks.

Not surprisingly, the group that rated the photo category Attached, Two-Story Buildings as at least ‘somewhat’ compatible (mean > 2.9), also rated all three of the factored responses to written questions that correlate with higher densities, smart growth and sustainable development higher. These responses are: features that

enhance mobility (paths, transit opportunities, proximity to amenities), compact and connected neighborhood layouts and community planning and development (diverse

Table 4.12: Responses to Written Questions (Features and Issues) Related to Higher Densities, Smart Growth and Sustainable Development compared with Higher Density Photo Categories, t-test results

Test Variable	**Grouping Variable: Ratings of Photos**				**Test of Significance**		
	More Compatible		**Less Compatible**				
	Attached, 2 Story						
Features that enhance mobility (paths, transit opportunities, proximity to amenities)	n	68	n	178	t	d.f	P<
	m	3.96	m	3.56	3.799	244	.000
	s.d.	.660	s.d.	.780			
Compact and connected neighborhood layouts	n	66	n	177	t	d.f	P<
	m	3.08	m	2.78	2.376	241	.050
	s.d.	.847	s.d.	.859			
Community planning and development (diverse tax base, compact developments that protect open space, affordable housing, concentrate new development near existing)	n	64	n	178	t	d.f	P<
	m	3.80	m	3.29	4.310	240	.000
	s.d.	.709	s.d.	.838			
	4 to 5 Story Residential						
Features that enhance mobility (paths, transit opportunities, proximity to amenities)	n	13	n	232	t	d.f	P<
	m	4.54	m	3.62	4.338	243	.000
	s.d.	.602	s.d.	.751			
Community planning and development (diverse tax base, compact developments that protect open space, affordable housing, concentrate new development near existing)	n	12	n	230	t	d.f	P<
	m	4.29	m	3.38	3.785	240	.000
	s.d.	.689	s.d.	.819			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible; features, issues and concerns: 1= not at all important, 5= very important)

tax base, compact developments that protect open space, affordable housing, and concentrate new development near existing). Additionally, the first and third of the factored responses above were rated higher by the group that ranked the photo category Four to Five Story Residential at least 'somewhat' compatible (mean > 2.9) (Table 4.12).

The results reported above indicate that opposition to alternative development models is less likely from people who value features that enhance mobility (paths, transit opportunities, proximity to amenities), compact and connected neighborhood layouts and community planning and development (diverse tax base, compact developments that protect open space, affordable housing, and concentrate new development near existing). However, alternative development models can vary widely and these results do not offer detail about preferences related to specific elements. For instance, although this group has favorable perspectives towards transit opportunities, it did not translate to a favorable rating of the photo scene of a residential building with a commuter rail stop in the foreground.

The scene with a commuter rail stop (P8) did not load in any of the five factored categories of photographs. However, nearly everyone thought that the scene was not at all compatible with their town. It received the second lowest mean ranking, 1.30. Given the results above, one would predict that people with favorable perspectives towards transit opportunities, as indicated by their responses to the written questions, would have higher ratings of this image. Surprisingly, this was not

the case. The group that ranked features that enhance mobility (paths, transit opportunities, proximity to amenities) as more important rated this image at 1.32, while everyone else rated it at 1.30, clearly there was not a significant difference (t= .240, d.f = 241, P<0.810).

Since this group responded favorably towards transit opportunities, as indicated by their responses to the written questions, it is likely that the negative reaction to the photo is based on the appearance of the commuter rail stop, and not the idea of its presence adjacent to a residential development. This indicates the need for design recommendations for transit-oriented-development that provide buffering to mitigate undesirable views, which could also help to minimize the impacts of noise.

Support for sustainable development was also measured with questions that asked how willing respondents would be to trade a large yard or pay up to 20% more for some typical features of sustainable development and how differently they would have rated all of the photographs, had they known the developments had been designed to meet sustainability benchmarks. Answers to these questions from the groups that gave higher ratings to each of the four groups of photos of neighborhoods appearing to have higher densities and other smart growth and new urbanist design elements reveals significant trends.

Groups that gave ratings over 2.9 to *each* of the four groups of photos that appear to have higher densities and elements somewhat typical of smart growth and new urbanist designs, also indicated a much greater willingness to trade a large yard for certain features of sustainable development and a much greater willingness to pay up to 20% more for certain features of sustainable development (Table 4.13).

Table 4.13: Responses to Written Questions (Trade-offs and Impact of Additional Information on Photo Ratings) Related to Higher Densities, Smart Growth and Sustainable Development Compared with Higher Density Photo Categories, t-test Results

Test Variable	**Grouping Variable: Ratings of Photos**				**Test of Significance**		
	More Compatible		**Less Compatible**				
	Detached, 2 Story						
Willing to trade a large yard for sustainable development features	n	79	n	151	t	d.f	P<
	m	3.37	m	2.85	3.31	228	.001
	s.d.	1.13	s.d.	1.14			
Willing to pay up to 20% more for sustainable development features	n	79	n	151	t	d.f	P<
	m	3.09	m	2.62	3.26	228	.001
	s.d.	.987	s.d.	1.05			
Would have rated all of the photos higher with knowledge of env. aspects	n	79	n	146	t	d.f	P<
	m	3.77	m	3.46	3.53	223	.001
	s.d.	.627	s.d.	.636			
	Attached, 2 Story						
Willing to trade a large yard for sustainable development features	n	62	n	168	t	d.f	P<
	m	3.63	m	2.81	5.03	228	.000
	s.d.	.960	s.d.	1.15			
Willing to pay up to 20% more for sustainable development features	n	62	n	168	t	d.f	P<
	m	3.12	m	2.66	3.05	228	.005
	s.d.	1.01	s.d.	1.04			
Would have rated all of the photos higher with knowledge of env. aspects	n	62	n	163	t	d.f	P<
	m	3.84	m	3.46	4.04	223	.000
	s.d.	.686	s.d.	.605			
	Mixed-Use Appearance						
Would have rated all of the photos higher with knowledge of env. aspects	n	40	n	185	t	d.f	P<
	m	3.75	m	3.53	1.98	223	.050
	s.d.	.592	s.d.	.656			
	4 to 5 Story Residential						
Willing to pay up to 20% more for sustainable development features	n	11	n	218	t	d.f	P<
	m	3.61	m	2.73	2.74	227	.010
	s.d.	.929	s.d.	1.04			
Would have rated all of the photos higher with knowledge of env. aspects	n	11	n	213	t	d.f	P<
	m	3.95	m	3.54	2.08	222	.050
	s.d.	.725	s.d.	.637			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible; tradeoffs: 1= not at all willing 5= very willing; impact of additional information on photos: 1= would have rated the photos much lower 5= would have rated the photos much higher)

Respondents who gave higher ratings to these four photo groups also indicated that they would have given all of the photos even higher ratings, had they know the developments were designed to meet sustainability benchmarks. It seems that this group, to some extent, while initially rating the photos, understood and supported the intentions of the design, resulting in higher ratings. Therefore, when asked to consider what the impact of additional information about achieving sustainability benchmarks would be on their ratings, for this group, the additional information was congruent with information that they had initially perceived and were supportive of, resulting in higher ratings still.

Answers to the written questions communicate that this group values efforts at sustainable development. The statistically significant relationships that were found between groups who rated the photos showing higher density, smart growth and new urbanist neighborhoods higher and their answers to the written questions may indicate that during the photo ratings, respondents were reacting favorably to elements of sustainable development visible in the photographs because, to some extent, they understood and supported the intentions of the design.

4.5.3 Favorable Perceptions of Maintaining Low-Density Patterns of Development

Patterns in the responses to written questions and photo ratings reveal that that a different sub-set of the respondents favor maintaining low-density patterns of development and the rural qualities of their town. While the previous example showed a relationship between higher ratings for the scenes with higher densities and

higher ratings for certain written questions, the following example shows a relationship between lower ratings for the scenes with higher densities and higher ratings for a different set of written questions.

A sub-set of the respondents expressed a strong preference for maintaining low-density patterns of development, especially its visual aspects. In addition to lower ratings for one or more of the four categories of photos showing higher densities, written questions revealed that this group favors features that characterize calm and scenic neighborhoods such as, privacy, quiet, low-traffic streets, landscaping and views to nature. This group attributed a greater level of importance to slowing the pace of residential development in town and preserving farms. Additionally, this group indicated a higher level of potential concern for aesthetics and different housing types or styles, if faced with a new development proposal in their neighborhood.

These trends were identified through several t-tests. Respondents who thought that calm and scenic neighborhood features were most important (mean higher than 3.9) gave the photo group Detached, Two-Story Buildings lower ratings (mean 2.46 versus 2.77, t= -2.59, d.f = 244, P<.010). Additionally, the group that would be most concerned about a new development based on its aesthetics or different type or style gave lower ratings to two of the photo groups, Detached, Two-Story Buildings (mean 2.40 versus 2.70, t= -2.74, d.f = 228, P<.010) and Attached, Two-Story Buildings (mean 2.26 versus 2.49, t= -2.23, d.f = 228, P<.050) (Tables 4.14 and 4.15).

These results reveal logical patterns to the way that respondents answered the questions. It makes perfect sense that people who attribute greater importance to features of calm and scenic neighborhoods (privacy, quiet, low-traffic streets,

Table 4.14: Responses to Written Questions (Aesthetics and Other Considerations) Related to Maintaining Low Densities compared with Higher Density Photo Categories, t-test Results, Part 1

Test Variable	**Grouping Variable: Ratings of Photos**				**Test of Significance**		
	More Compatible		**Less Compatible**				
	Detached, 2 Story						
Features of calm and scenic neighborhood	n	83	n	163	t	d.f	P<
	m	4.11	m	4.31	-2.43	244	.050
	s.d.	.682	s.d.	.559			
Concerns about a new development based on its aesthetics or different type or style	n	77	n	153	t	d.f	P<
	m	3.62	m	3.92	-2.40	228	.050
	s.d.	1.03	s.d.	.856			
	Mixed-Use						
Features of calm and scenic neighborhood	n	44	n	202	t	d.f	P<
	m	4.04	m	4.29	-2.44	244	.050
	s.d.	.770	s.d.	.561			
Preservation (slow pace of residential development, preserve farms)	n	43	n	201	t	d.f	P<
	m	3.83	m	4.16	-2.40	242	.050
	s.d.	.969	s.d.	.803			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible; tradeoffs: 1= not at all willing 5= very willing; impact of additional information on photos: 1= would have rated the photos much lower 5= would have rated the photos much higher)

landscaping and views to nature) and preservation issues (slowing the pace of residential development in town and preserving farms), as well as potential concerns in the event of a new development related to aesthetics, different housing types or styles, would have rated the detached, two story buildings and Mixed-Use Appearance photo groups as less compatible with their towns. Amongst this group,

the expressed preference seems to be maintaining the existing low-density patterns of development, especially the visual aspects. These results indicate that overcoming opposition to denser residential development could be achieved if proposals include attractive, appropriate-looking architecture, a preserved open space component, high quality landscaping plans and well thought out strategies for dealing with traffic.

Table 4.15: Responses to Written Questions (Aesthetics and Other Considerations) Related to Maintaining Low Densities compared with Higher Density Photo Categories, t-test Results, Part 2

Test Variable	**Grouping Variable: Perceptions of Residential Neighborhoods**				**Test of Significance**		
	More Important		**Less Important**				
	Features of calm and scenic neighborhoods						
Detached, Two-Story Buildings photo group	n	185	n	61	t	d.f	P<
	m	2.46	m	2.77	-2.59	244	.010
	s.d.	.825	s.d.	.827			
	Concerns about a new development based on its aesthetics or different type or style						
Detached, Two-Story Buildings photo group	n	127	n	103	t	d.f	P<
	m	2.40	m	2.70	-2.74	228	.010
	s.d.	.813	s.d.	.864			
Attached, Two-Story Buildings photo group	n	127	n	103	t	d.f	P<
	m	2.26	m	2.49	-2.23	228	.050
	s.d.	.784	s.d.	.751			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible; features, issues and concerns: 1= not at all important, 5= very important)

4.5.4 Demographic Variables & Residential Setting

The photo category Open Space Dominant / Buildings in Background appears to have the lowest densities of all of the photo groups and had a somewhat universal appeal (mean 3.64). The only demographic variable shown to have a significant

relationship with higher ratings for these photos was children (Table 4.16). Those with one or more child living at home rated the photo category as more compatible (mean 3.73) than people without kids living with them (mean 3.52, t=1.95, d.f.=226, P<.050). It is certainly not surprising that this group would feel positively about neighborhood scenes with the appearance of low- density, single-family homes and open spaces with lawn.

Table 4.16: Comparison between Households with Children and Compatibility of Open Space Dominant / Buildings in Background Photo Group, t-test Results

Test Variable	**Grouping Variable: Demographic Factor**				**Test of Significance**		
	Live in a home *with* one or more people under 18 years old		**Live in a home *without* people under 18 years old**				
Open Space Dominant / Buildings in Background Photo Group	n	110	n	118	t	d.f	P<
	m	3.73	m	3.52	1.96	226	.050
	s.d.	.714	s.d.	.907			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible)

A particular set of factors related to residential setting was found to be significant because it distinguished resident's perceptions of compatibility of the group of photos called Attached, Two-Story Buildings (Table 4.17). This group of photos was more likely to be perceived as incompatible with town character by respondents living in a single-family, detached home, versus respondents that live in an apartment, townhouse or condominium. Also more likely to perceive this photo group as incompatible were respondents living on a lot one acre or larger (versus respondents living on a lot less than one acre), respondents who have lived in their

current residence 15 years or more (versus respondents living at their current residence less than 15 years), and respondents living in a neighborhood described as rural with country roads (versus residents of other types of neighborhoods.)

Table 4.17: Comparison between Residential Setting and Compatibility of Attached, Two-Story Buildings Photo Group, t-test Results

Test Variable	**Grouping Variable: Residential Setting**				**Test of Significance**		
Attached, Two-Story Buildings Photo Group	**Single family detached**		**Apartment, Townhouse or condo.**				
	n	194	n	30	t	d.f	P<
	m	2.27	m	2.95	-4.66	222	.000
	s.d.	.742	s.d.	.754			
	Lot size one acre or larger		**Lot size under one acre**				
	n	117	n	72	t	d.f	P<
	m	2.19	m	2.46	-2.42	187	.050
	s.d.	.725	s.d.	.770			
	Lived at current address 15 years or more		**Lived at current address fewer than15 years**				
	n	102	n	128	t	d.f	P<
	m	2.26	m	2.48	-2.10	228	.050
	s.d.	.796	s.d.	.758			
	Neighborhood is rural with country roads		**Other neighborhood type**				
	n	109	n	121	t	d.f	P<
	m	2.27	m	2.49	-2.13	228	.050
	s.d.	.798	s.d.	.745			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible)

In addition to lower ratings for the Attached, Two-Story Buildings Photo Group (mean 2.26 versus 2.48, t= -2.10, d.f = 228, P<.050), people that have lived in their current residence 15 years or more (‘long-time residents’) share other common

Table 4.18: Comparison between Long-Term Residents and Responses to Written Questions and Compatibility of Photo Groups, t-test Results

Test Variable	**Grouping Variable: Demographic Factor**				**Test of Significance**		
	Years at current address						
	15 or more		**fewer than15**				
Attached, Two-Story Buildings Photo Group	n	102	n	128	t	d.f	P<
	m	2.26	m	2.48	-2.10	228	.050
	s.d.	.796	s.d.	.758			
Features related to housing diversity (affordable, variety of building types, styles and sizes)	n	104	n	124	t	d.f	P<
	m	3.80	m	3.58	2.37	226	.050
	s.d.	.701	s.d.	.701			
Willing to trade a large yard for sustainable development features	n	100	n	125	t	d.f	P<
	m	2.78	m	3.25	-3.06	223	.005
	s.d.	1.12	s.d.	1.14			
Amount of changes seen in town	n	104	n	127	t	d.f	P<
	m	4.24	m	3.48	7.02	229	.000
	s.d.	.611	s.d.	.952			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible; features: 1= not at all important, 5= very important; trade-offs: 1= not at all willing 5= very willing; changes: 1= none 5= very much)

perspectives (Table 4.18). Long-time residents rated neighborhood features related to housing diversity (affordable, mixture of housing types, varied building styles and sizes) as more important (mean 3.80 versus 3.58, t= 2.37, d.f = 226, P<.050). In particular, the importance of affordability to long-time residents must not be overlooked. Many respondents wrote comments on their survey which described the trend over the last ten to fifteen years towards building large “McMansion” homes in their town and the negative results which have ensued. One respondent explained, "Rising real estate taxes (for seniors) slowly driving long time residents (seniors) out of the town- local building of condos also very costly for seniors, forcing them to consider/move to other less desirable towns. Assessments on homes give no relief for

over 75 residents (who are no longer employed)." (See Appendix E: Sample of Respondents' Comments for more.)

Long-time residents were less willing to trade a large yard for features of sustainable development (environmentally friendly site design, common open space (parks and natural areas), a location within walking distance of schools, stores and restaurants and shorter commute time) (mean 2.78 versus 3.25, t= -3.06, d.f = 223, P<.005). Those who hold the same residence for 15 or more years are most likely content with their current living situation, which may have been a factor in this group's reticence towards making trade-offs. Not surprisingly, this group of long-time residents also reported seeing more changes in their town (mean 4.24 versus 3.48, t= 7.02, d.f = 229, P<.000).

Looking at the relationship between residential setting and the results of the photo ratings and written questions shows that the impact of development decisions can vary depending on the character of a particular neighborhood. To discern the character of respondents' neighborhoods, the survey included a list of descriptions and respondents were asked to mark all of the ones that matched their current neighborhood setting. The choices respondents were given were 'village or town center', 'pre-1945 neighborhood', 'post-1945 neighborhood', 'rural with country roads', 'lakeside' and 'cluster development (contains commonly-owned open space)'. Respondents were asked to mark as many answers as applied because they are not mutually exclusive, i.e., someone can live in both a pre-1945 neighborhood and a village or town center, or live in a cluster development that also seems rural. By comparing neighborhood type with answers to the written questions and photo

ratings, more group differences in perceptions of residential neighborhoods emerge. Significant results were found amongst those who described their neighborhood as village or town center versus those that did not; those who described their neighborhood as pre-1945 versus those that did not; those who described their neighborhood as rural with country roads versus those that did not and those who described their neighborhood as a cluster development versus those that did not (Table 4.19).

The results are highly logical. Residents of village and town centers value features related to housing diversity (affordable, variety of building types, styles and sizes) (mean 3.96 versus 3.62, t= 2.84, d.f = 226, P<.005) and compact and connected neighborhood layouts (mean 3.27 versus 2.76, t= 3.49, d.f = 222, P<.001). Residents of pre-1945 neighborhoods very much appreciate the small, rural and historic characteristics of town (mean 4.27 versus 4.00, t= 2.31, d.f = 228, P<.050) and thought that the photos that had a mixed-use appearance were less compatible than respondents who did not describe their neighborhood as pre-1945 (mean 1.89 versus 2.13, t= -1.97, d.f = 228, P<.050) (Table 4.19).

Residents of rural areas also very much appreciate the small, rural and historic characteristics of town (mean 4.18 versus 3.95, t= 2.44, d.f = 228, P<.050), plus they perceive issues related to preservation (slowing the pace of residential development, preserving farms) as more important than do residents living in less rural settings (mean 4.24 versus 3.97, t= 2.34, d.f = 223, P<.050). Residents of rural areas also thought that a connected and compact neighborhood layout was less important (mean 2.73 versus 2.99, t= -2.27, d.f = 222, P<.024) and rated the Attached, Two-Story

Table 4.19: Comparison between Neighborhood Type and Responses to Written Questions and Compatibility of Photo Groups, t-test Results

Test Variable	Grouping Variable: Neighborhood Type				Test of Significance		
	YES		NO				
	Village or town center						
Features related to housing diversity (affordable, variety of building types, styles and sizes)	n	43	n	185	t	d.f	P<
	m	3.96	m	3.62	2.84	226	.005
	s.d.	.623	s.d.	.715			
Compact and connected neighborhood layouts	n	41	n	183	t	d.f	P<
	m	3.27	m	2.76	3.49	222	.001
	s.d.	.994	s.d.	.801			
	Pre-1945 neighborhood						
Mixed-Use Appearance Photo Group	n	52	n	178	t	d.f	P<
	m	1.89	m	2.13	-1.97	228	.050
	s.d.	.806	s.d.	.801			
Appreciation of small, rural and historic characteristics of town	n	52	n	178	t	d.f	P<
	m	4.27	m	4.00	2.31	228	.050
	s.d.	.607	s.d.	.749			
	Rural area with country roads						
Attached, Two-Story Buildings Photo Group	n	109	n	121	t	d.f	P<
	m	2.27	m	2.49	-2.13	228	.050
	s.d.	.798	s.d.	.745			
Appreciation of small, rural and historic characteristics of town	n	109	n	121	t	d.f	P<
	m	4.18	m	3.95	2.44	228	.050
	s.d.	.633	s.d.	.788			
Compact and connected neighborhood layouts	n	108	n	116	t	d.f	P<
	m	2.73	m	2.99	-2.27	222	.050
	s.d.	.841	s.d.	.846			
Preservation (slow pace of residential development, preserve farms)	n	108	n	117	t	d.f	P<
	m	4.24	m	3.97	2.34	223	.050
	s.d.	.750	s.d.	.912			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible; changes: 1= none 5= very much; features, issues and concerns: 1= not at all important, 5= very important; trade-offs: 1= not at all willing 5= very willing)

Table 4.19: Comparison between Neighborhood Type and Responses to Written Questions and Compatibility of Photo Groups, t-test Results (Continued)

Test Variable	**Grouping Variable: Neighborhood Type**				**Test of Significance**		
	YES		**NO**				
	Cluster development (contains commonly-owned open space)						
Attached, Two-Story Buildings Photo Group	n	33	n	197	t	d.f	P<
	m	2.84	m	2.31	3.72	228	.000
	s.d.	.757	s.d.	.755			
Amount of changes seen in town	n	33	n	198	t	d.f	P<
	m	3.25	m	3.92	-4.13	229	.000
	s.d.	.922	s.d.	.859			
Features that enhance mobility (paths, transit opportunities, proximity to amenities)	n	32	n	195	t	d.f	P<
	m	3.99	m	3.63	2.50	225	.050
	s.d.	.664	s.d.	.761			
Community planning and development (diverse tax base, compact developments that protect open space, affordable housing, concentrate new development near existing)	n	31	n	193	t	d.f	P<
	m	3.74	m	3.40	2.12	222	.050
	s.d.	.807	s.d.	.826			
Concerns about a new development based on its aesthetics or different type or style	n	33	n	193	t	d.f	P<
	m	3.44	m	3.87	-2.48	224	.050
	s.d.	1.07	s.d.	.895			
Willing to trade a large yard for sustainable development features	n	33	n	193	t	d.f	P<
	m	3.64	m	2.95	3.28	224	.001
	s.d.	.964	s.d.	1.16			
Willing to pay up to 20% more for sustainable development features	n	33	n	196	t	d.f	P<
	m	3.15	m	2.74	2.09	227	.050
	s.d.	.936	s.d.	1.07			

(Mean scores based on a Likert scale, photos: 1= not at all compatible, 5= very compatible; changes: 1= none 5= very much; features, issues and concerns: 1= not at all important, 5= very important; trade-offs: 1= not at all willing 5= very willing)

Buildings photo group as less compatible (mean 2.27 versus 2.49, t= -2.13, d.f = 228, P<.050) (Table 4.19).

The responses of residents of cluster developments also made sense. Residents of cluster developments were significantly more willing to trade a large yard for sustainable development features (mean 3.64 versus 2.95, t= 3.28, d.f = 224, P<.001). One would hope so, given that one of the sustainable development features listed on the survey was common open space and the basic principle of cluster developments is smaller individual lots with community open space. Residents of cluster developments were also more willing to pay up to 20% more for sustainable development features (mean 3.15 versus 2.74, t= 2.09, d.f = 227, P<.050). (Table 4.19).

Issues related to community planning and development (diverse tax base, compact developments that protect open space, affordable housing, and concentration of new development near existing) were more important to residents of cluster developments (mean 3.74 versus 3.40, t= 2.12, d.f = 222, P<.050), as were features that enhance mobility (paths, transit opportunities, proximity to amenities) (mean 3.99 versus 3.63, t= 2.50, d.f = 225, P<.050). Again, these results are logical, given that several of the responses contain characteristics typical of cluster developments (compact development that protects open space and paths). (Table 4.19).

Residents of cluster developments reported seeing less change to their towns (mean 3.25 versus 3.92, t= -4.13, d.f = 229, P<.000), possibly because they are buffered from such impacts by the preserved open space in their neighborhoods, as was found in other studies of residential perceptions (Ryan 2002, 2006). It follows,

therefore, that residents of cluster developments also indicated that in the event of proposed development, aesthetics or differing type or style of development would not be as much of a concern, as it would be for those who do not live in cluster developments (mean 3.44 versus 3.87, t= -2.48, d.f = 224, P<.050). Although still considered only ‘a little’ to ‘somewhat’ compatible, the ratings of the attached, two-story buildings photo group were significantly higher for those who live in cluster developments compared with those who do not (mean 2.84 versus 2.31, t= 3.72, d.f = 228, P<.000) (Table 4.19).

People seemed to respond positively to aspects of neighborhoods that are similar to their current neighborhood. It seems likely that these features were important to people as they were selecting their current residence. These insights indicate that the compatibility of new development proposals depends not just on town character, but neighborhood character as well. This new knowledge points to opportunities for overcoming community opposition to denser development, for instance by emphasizing (or de-emphasizing) certain aspects of a proposed design in conversations or informational materials depending on the neighborhood type of the intended audience.

CHAPTER 5

DISCUSSION OF FINDINGS

5.1 Introduction

Though the study sample only represents a small sample of the towns' residents, the results corroborate some of the findings from other studies which were discussed in chapter 2, the literature review. Analysis of the survey results found that nearly all respondents expressed strong environmental values and consider basic issues related to sustainability to be very important. However, the general level of support for smart growth and sustainable development was lukewarm.

First this chapter explores the possibility that the unique demographic characteristics of the sample strongly contributed to this lukewarm response. Next, the discussion moves beyond looking at the sample in aggregate, to the two major sub-groups that were discovered through the data analysis reported in the last chapter. One sub-group clearly supports denser, sustainable development alternatives and values neighborhood planning that reduces auto dependency, meets the needs of households with various incomes and protects open space. A larger sub-group is comprised of residents who favor calm, scenic, low density neighborhoods and would like to see their community preserve its open spaces and maintain its historic and rural aesthetic.

After the two sub-groups are discussed, the impact of three additional factors on respondents' answers will be explored. These factors are current neighborhood setting, preference for views of nature and open spaces and visual design variables

that influenced perceived density. The final topics of the chapter are opportunities for future research and assessment of survey methods.

5.2 Unique Demographic Characteristics of the Sample

The review of relevant literature found that proponents of increasing residential densities cite changing demographic trends as indication that housing needs are changing. Specifically, that larger homes are not as necessary due to smaller proportions of households comprised of couples with children and shrinking number of residents in each household. However, the demographic make-up of the study sample differs somewhat from national trends. The average number of persons per household nationally in 2000 was 2.59, while the average for the study sample was 3.05 (U.S. Census, 2000).

Nationally in 2000, households without children totaled 66%, while in the study sample households without children totaled 52% (U.S. Census, 2000). Furthermore, while nationally in 2000, 10% of all households were comprised of single parents and their child or children, while only 1 of the 253 respondents indicated that their household was comprised of themselves and one child (U.S. Census, 2000).

Compared with national averages, the study sample is characterized by an average of more residents per home, more homes with children and fewer single-parent households. These factors may have contributed to greater preferences for low-density, conventional suburban settings amongst the study sample than would have been found in other areas. In fact, analysis showed that respondents living with one or

more child were significantly more likely to rate the photo group that appeared the least dense as more compatible than respondents who do not live with any children.

Additional factors may have further contributed to these preferences. The review of relevant literature in chapter 2 also found that higher density; mixed-use neighborhoods are most preferred by younger professionals (Flint, 2006; Haughey 2005). However, respondents do not reflect that age group; 2.1% are under 30 years old and 30 to 39 year olds only made up 14.8% of the sample. Relevant literature also attributed trends towards higher density; mixed-use neighborhoods to aging baby boomers who no longer consider schools as a criteria for neighborhood selection, but rather, value denser, centralized locations (Steuteville, 2007; National Association of Realtors, 2004; Meyers, 2001; Schmitz, 2004). Again, the respondents do not reflect this trend. Good schools were found to contribute quite a bit to what respondents like about their town, surprisingly, amongst both households with and without children.

5.3 Preference for Sustainable Development

"I personally like being able to walk to get milk, newspapers, small groceries, so sense of small town is important to me. All developments should be as efficient as possible. New cluster developments have obviously been added to this town but the condo style is either very expensive or uninteresting or both and none seem to have the convenience of walking (perhaps one)."

"In the future it should be law that all new construction - commercial and residential be environmentally friendly. More solar! Cost should not dictate what materials are used - our future is truly at stake because of oil. We need new energy sources."

(Anonymous survey responses, see Appendix E: Sample of Respondents' Comments for more)

Similar to previous studies (Goldberg, 2007; National Association of Realtors, 2004; Meyers, 2001; Schmitz, 2004; Steuteville, 2007), nearly all survey respondents expressed a preference for certain neighborhood features that are frequently part of a smart growth/ new urbanist/ sustainable neighborhood such as nearby parks and open space, walking and biking paths, nearby transit (public transportation) and convenient shopping/ dining opportunities. However, as detailed in the last chapter, a sub-group emerged which expressed stronger support for sustainable development in both the ratings of the photographs and the other written questions.

Previous studies also found sub-groups that more strongly support sustainable development within larger study samples. O'Keefe (2003) claims that many new urbanist consultants and developers have estimated the demand for these developments at about thirty percent of the market share. Fifty-five percent of respondents to a residential market survey in Atlanta, Georgia metropolitan area (discussed in the literature review) indicated that higher residential densities and smaller lots would be acceptable trade-offs for a shorter commute. Fifty-six percent indicated that a somewhat smaller house would be an acceptable trade-off for a neighborhood with easy options for walking, cycling or taking mass transit, as opposed to the choice of a larger house in a neighborhood that required driving to get everywhere (Goldberg, 2007). Furthermore, people who favored new urbanist neighborhoods enough to purchase a home in one were also willing to pay a premium of approximately 12% for the new urbanist features of that neighborhood (Tu and Eppli, 2001).

The literature cited above puts the market for sustainable development at one-third to one-half of current homebuyers, which is very similar to the results of this study. The percentages of respondents who were 'quite a bit' to 'very' willing to make the trade-offs in favor of certain elements of sustainable development range from 19.8% to 41.5% (Table 5.1).

Table 5.1: Potential Market for New Urbanism and Sustainable Development

Trade-offs	Number of Valid Responses	Mean >3.9	
		Number	Percent
Trade a large yard for…			
environmentally friendly site design	225	94	**36.4**
common open space (parks, natural areas)	227	94	**41.5**
a location within walking distance of schools, stores and restaurants	229	87	**38**
a shorter commute time	225	87	**38.7**
Pay up to 20% more for…			
pedestrian friendly/ walkable	230	87	**37.8**
green building materials and practices	227	70	**30.8**
a more central location	227	45	**19.8**

(Mean scores based on a Likert scale, 1= not at all willing 5= very willing)

5.4 Preference for Low-Density Subdivisions

"I like the concept of cluster development much more than the reality of actually living in one. It seems appropriate for 55+ communities, or in urban environments (Somerville, Cambridge), but I sacrificed my commute time to gain privacy, trees, a yard. I'm not looking for a pseudo-urban community. I think it will take a lot more education to sway people like me, who just moved to the suburbs in the past 5-10 years."

(Anonymous survey response, see Appendix E: Sample of Respondents' Comments for more)

On average for survey participants, the most important group of features for residential neighborhoods includes aesthetically pleasing buildings, street trees, privacy, quiet, low traffic streets, landscaping and views to nature/ open space. While these items are not necessarily synonymous with low-density neighborhoods, they tend to be more prevalent in there. The photo group that appeared the least dense received the highest rating, while four other photo groups depicting what appears to be higher density neighborhoods, ranging from compactly arranged, single-family, detached homes to attached, multi-story residences, received lower ratings.

Furthermore, as covered in the previous chapter, a sub-group, which was discerned through data analysis largely consisting of t-tests, more strongly favors calm, scenic, low density neighborhoods and would like to see their community preserve its open spaces and maintain its historic and rural aesthetic

5.5 Impacts of Current Neighborhood Setting on Preference

The national idealization of the suburb described in the review of relevant literature in chapter 2 (Flint, 2005; Kain, 1967; Holleb, 1978; Churchman, 1999) is well represented in Hopkinton and Southborough. In these towns, over 80% of all homes are single family detached and average lot sizes are between one and two acres. The literature confirms the dominance of this pattern of development throughout the region and the state (Boston Metropolitan Area Planning Council (MAPC), 2007; Breunig, 2003; Massachusetts Executive Office of Energy and Environmental Affairs (EOEA), 2008). Consequently, respondents' preference for the group of photos that appeared to have the lowest density was not surprising. These

results are corroborated by Ryan (2002) where respondents to a photo-based survey were much more likely to consider scenes of subdivisions compatible with rural character if they were residents of smaller lots rather than residents of larger rural parcels, presumably because the subdivision scenes appeared more similar to the smaller lots. This led to the hypothesis for this study that the more similar a photo of a neighborhood appears to a respondent's current neighborhood, the more likely they will be to find it acceptable.

However, comparison of answers to the written questions amongst residents of different neighborhood types revealed many more significant differences than the same analysis with the photo ratings. The reason may be that most of the images were not perceived to be very similar to any of the different types of neighborhoods in Hopkinton and Southborough. The photo group that appeared the most similar to existing neighborhoods in the towns (Open Space Dominant / Buildings in Background) was also rated similarly by residents of all neighborhood types.

A few examples group differences in the answers to the written questions based on neighborhood type are given below; complete results are reported in detail, in chapter 4. One group difference is that residents of village and town centers are more likely to value features related to housing diversity (affordable, variety of building types, styles and sizes) and compact and connected neighborhood layouts. Residents of rural areas are more likely to appreciate the rural, small town feel and historic characteristics of their town and are more likely to perceive issues related to preservation (slowing the pace of residential development, preserving farms) as

important and less likely to consider a connected and compact neighborhood layout important.

Residents of cluster developments reported seeing less change to their towns, possibly because they are buffered from such impacts by the preserved open space in their neighborhoods, as was found in other studies of residential perceptions (Ryan, 2002, 2006). Therefore, it was comprehensible that residents of cluster developments also indicated that in the event of proposed development in their area, aesthetics or differing type or style of development would not be as much of a concern as did residents of other types of neighborhoods.

5.6 Preference for Views of Nature and Open Spaces

Many visual preference studies have revealed that views of nature and easily accessible open space have been shown to contribute highly to residents' levels of satisfaction with their neighborhood, no matter what the density is (Kaplan, 2001; 2004; Kearney, 2006; Sullivan, 2006; Jorgensen, 2007). Therefore, it was predicted that this study would find views of nature and easily accessible open space to be important to local residents. Numerous examples from the results of both the written questions and the photo ratings confirm the phenomenon. Respondents indicated that important features for residential areas are street trees, landscaping around homes/ buildings and views to nature and other open space from home.

The category of images called Open Space Dominant / Buildings in Background, received the highest rating. In addition to appearing to have the lowest density of all of the categories, some amount of lawn or mown grass appears in each

picture and trees and shrubs screen the view of some of the buildings. Photos in this group depict clustered homes surrounded by lawn, whereas, in other photos group, homes are configured in a linear fashion, along a street. As was found in Ryan (2002), the former configuration was preferred to the latter.

Ratings from two of the other photo groups further exemplify the impact of vegetation on people's perceptions and continue to corroborate previous studies (Kaplan, 2001, 2004; Kearney, 2006; Sullivan, 2006; Jorgensen, 2007). The category, called Detached, Two-Story Buildings, received the second highest mean rating. The most striking difference within the group is the variable amount of vegetation. In the top ranked photo of the group the buildings are obscured by vegetation more than in any of the other scenes in the group. Four of the six images contain trees and shrubs. The two images that received the lowest ratings have almost no visible vegetation.

An important factor in the relative impact of vegetation on visual preference is the age and maturity of the plants. For instance, each image in the Mixed-Use Appearance category contains trees, however they are young. Young trees are smaller and tend to be less noticeable and therefore, less effective. Similarly, deciduous trees without their leaves often are easy to overlook in photographs. Leafless trees should be avoided for visual preference surveys, especially if some scenes have leaves and some do not, as that could induce biases (Kaplan and Kaplan, 1989). Whether people perceive it subconsciously or consciously, young trees give the impression of a newer development, which indicates changes in the community where it is located. Mature vegetation connotes permanence and can give the impression that a development is part of the established character of a town.

In addition to the categories that factor analysis revealed, other trends were identified by looking at the 40 individual photographs, ranked in order from highest to lowest. (See Appendix D: Photos: Mean Ratings Highest To Lowest). The presence or absence of vegetation and especially, mature vegetation, made a big difference in the ratings. The 7 images with the highest rankings contain mature vegetation, occasionally with younger vegetation as well. The 11 images that received the lowest rankings have either no vegetation or very young trees.

5.7 Impacts of Visual Variables on Perceptions of Density

The 40 images, which were randomly ordered in the survey, show scenes from 7 different neighborhoods. Compatibility ratings varied significantly from one another for scenes of the same developments (See Appendix C Photos: Mean Ratings by Development). This shows the importance of visual cues in forming perceptions. Since it was more important to measure perceptions, it was not important for respondents to know the exact densities of the neighborhoods that they were looking at. Perceptions of appearance inform appropriate strategies for making new, denser, more sustainable neighborhoods that will look compatible with existing character.

The review of relevant literature in chapter 2 includes a section that addresses the capacity for physical elements to be manipulated, with dramatic differences in the way people feel about neighborhoods. The study by Churchman (1999) found that people form ideas about the density of a place partly based on variables, including visual cues that can be independent of the actual number of people per unit area.

These variables can be designed for desired visual effects, as exemplified by one of the photographed neighborhoods in the survey.

Battle Road Farm in Lincoln, Massachusetts received the highest mean rating of the seven (randomly ordered) developments used in the survey (See Appendix C Photos: Mean Ratings by Development). The dwelling units *appear* to be single family detached, however, things are not always as they seem. The structures have three to four units per building, but the buildings have been carefully designed to look like rambling New England farmhouses with gabled roofs, porches and various attached outbuildings. Spearheaded by Keen Development Corporation, Battle Road Farm is an exemplary model for creating a multi-family housing development that looks compatible with local character.

Like Battle Road Farm, multi-family developments in other parts of the country have been designed to resemble large single-family residences with regionally appropriate architecture. Often called "manor houses," this type of architecture has been employed by firms known for new urbanist/ neotraditional neighborhood design such as Looney Ricks Kiss, Architects, Inc. and Torti Gallas and Partners, Inc. Manor houses may be chosen as a design solution for a variety of situations, for example, in locations where market research has revealed a strong preference for the look of single-family homes or where a local market would not be able to support the commercial component of a mixed-use development (Murdock, 2005). Manor houses can allow a project to achieve greater densities in rural and rural/suburban locations where apartments or row houses could look out of context.

As with cluster developments/ conservation subdivisions, manor houses can be arranged to minimize site disturbance and protect high priority conservation areas.

A design featuring manor houses may help a project avoid local opposition; however, effective visual communication techniques are essential. For example, consider what reactions would be like from local residents who heard plans for a new development in their community described as120 units of mixed-income housing, with 40% low- and moderate- income households and 60% market rate units at a net density of 10 units per acre with an additional 12 acres of preserved open space. While those statistics describe Battle Road Farm, reactions to images would likely garner a very different reaction than the statistics alone.

5.8 Opportunities for Future Research & Assessment of Survey Methods

The axiom, "Think Global, Act Local" appropriately represents an important dimension to this study. In communities around the world, sustainable development practices are increasingly adopted in response to global environmental problems, yet these responses must vary widely in their choices about form, materials and aesthetics. It could prove extremely useful to adapt this study for other locations with unique demographics and social, architectural and economic histories. Barriers to sustainable development vary depending on location, calling into question many lines of inquiry about zoning regulations, environmental constraints and public opinion.

Although this study was not intended to test the public's level of awareness and understanding of the spatial aspects of land use and its environmental effects, the data suggests possible deficiencies, which warrant further investigation. This was

evidenced in several areas, especially with the issues of open space protection and compact development. Other studies (O'Keefe, 2003) have also reported results that have seemingly contradictory planning implications, for example survey respondents that want to live within walking distances from stores and services that also prefer a large single-family house in a suburban setting. Future studies could investigate public understanding of the environmental effects of land use patters and how that shapes their perceptions and attitudes.

Although beyond the scope of this survey, there are fundamental questions which relate to the underlying assumptions residents were operating under as they gauged each image's level of compatibility and answered the written questions. For example, what are the expectations for growth in the community? What is the nature of community character? Once a community has character, is it considered to be in a permanently fixed state? How should the community balance the desire to preserve what is essential about its character with the need to adapt to a constantly changing world?

This study highlights many more questions, practical in nature, faced daily by professionals and academics alike. For instance, just how compact does development need to be to achieve local goals for relieving growth pressure? How long will those solutions remain viable? Are they just stop-gap measures? Is protected land really protected? How can we better coordinate conservation and development when they are usually tasks undertaken by different professionals with different skill sets and perspectives? Is there any legal option to control rate of development besides large lot zoning? What solutions can be implemented to make sacrificing a large yard not only

tolerable, but desirable? What is the best approach for involving the community? How should technical information be communicated? What are citizens' perspectives on the work of their community leaders and regional planning agencies such as the Boston Metropolitan Area Planning Council (MAPC?) How should disagreements be addressed?

In hindsight, the survey could have been improved in several ways. First of all, when people were asked whether they were willing to pay more for certain features; they should have gotten more information about what they would get in return. For example, green building practices typically result in better indoor air quality which could result in health care savings that could potentially off-set the price premium in question. Future studies could benefit by being more descriptive about these costs and benefits.

Also suffering from a lack of description, was the use of the concept affordable. For one of the questions respondents were asked to consider the answer 'included some homes that were affordable to low-income residents.' Unfortunately, for multiple other questions throughout the survey, respondents were asked to consider the answer 'affordable' with no qualifier. It should have been made clearer whether they were to consider affordable in the sense of what they consider personally affordable for themselves or their families, affordable for the average resident or affordable for low income families.

Adding more information to the photographs may have been helpful. For example, the mixed-use condominiums in Canton, Massachusetts are across the street from the train station, knowledge of which may have influenced the ratings. Although

income was looked at in conjunction with responses to the question about willingness to pay more for sustainable development, it is unclear whether or not income was a factor in respondents' ratings of the photographs. No research was done on the current market value of any of the homes in the photographs; therefore, no analysis could be done to compare the ratings with respondents' income.

Initial phases of the study included the delineation of areas in Hopkinton and Southborough based on neighborhood characteristics for the purposes of investigating sub-group differences in the study sample. Households were categorized according to the density of the neighborhood and proximity to certain features, such as a lake or Weston Nurseries. Additionally, approximately one fourth of the households were assigned a second designation if they were in a rural road/area or near multi-family (but not a multi-family household itself.) On the survey respondents were asked to identify their neighborhood characteristics from a more simplified list. Due to time constrains, it was the respondents' self-designation which was used to investigate sub-group differences. The other data remains intact and may be used for future analysis.

A major difficulty in utilizing a photo-based questionnaire to test perceptions of a new style of development is the typically immature age of the vegetation. As shown in previous studies, as well as this one, the presence, amount and quality of vegetation has tremendous effect on photo ratings. The study might have been improved by controlling for this with photo manipulation, such as by replacing very young trees with older ones in each image. Alternately, a study could be designed which shows pairs of images of the same scene, one with vegetation added in. This

could test the effectiveness of the type and arrangement of the added vegetation at improving the appeal of the scene. As in this and previous studies, scenes with vegetation that screens views of buildings tend to be rated as much more compatible with rural and suburban character than scenes without screening vegetation, regardless of relatively higher densities.

In this study, as well as previous ones, respondents' reacted positively to aspects of neighborhoods that were similar to their current neighborhood. This indicates that a study sample from the same neighborhood is likely to be a self-selecting group, responding similarly to questions about their neighborhood preferences. Hypothetically, they moved to their current location because they liked it, which may create a bias against different types of neighborhoods. Since the intent of the study was to discern patterns of sustainable development compatible with existing communities at the western fringe of the metropolitan Boston area, this bias does not diminish the value of the data. It simply needs to be acknowledged. These resident perspectives are valuable so that development proposals can be crafted which balance the goals and concerns of all impacted parties.

In hindsight, rather than asking local residents to rate the 'compatibility' of various scenes of innovative developments, perhaps they should have been asked to rate the 'acceptability' of the scene. The distinction is important, yet nuanced, so it is not clear whether or not the results would have been different. The seven developments chosen for the survey represent some of the most esteemed and acclaimed attempts at sustainable development. To consider one of the scenes 'compatible' with existing community character, respondents may have placed more

emphasis on whether or not the scene resembled anything currently existing in town. Whereas, if asked to rate the scene's 'acceptability', respondents may have based their rating on a combination of factors such as its aesthetic appeal, inclusion of desirable features as well as compatibility with their current community. This is important because, although the developments might not look like anything currently in Hopkinton and Southborough, they were built with such exemplary attention to sustainability goals, that the impetus for their emulation is imperative.

CHAPTER 6

APPLICATIONS FOR SUSTAINABLE DEVELOPMENT:

MULTI-SCALAR, MULTI-STAKEHOLDER RECOMMENDATIONS

6.1 Introduction

Insight into the perspectives of residents throughout metropolitan Boston and beyond was gained via the sample's responses to the photographs and questions about residential preferences. Combining findings from the survey responses with key elements from previous studies forms the basis for the following set of recommendations on design and planning more sustainable developments.

6.2 Coordinate Conservation & Development Priorities across Multiple Scales

A myriad of government agencies and departments are making land use decisions from the local to the state level. This study suggests the need to work across jurisdictions and with neighboring communities to coordinate land use decisions and plan for infrastructure needs to streamline efforts and enhance results. Planners and related professionals should engage with civic groups, land trusts and developers to foster strong working relationships that can benefit the community. Willing partners in the effort for sustainable development come from every angle these days; for instance, many health advocates have a strong interest in community design.

Continue and expand current efforts to identify priority areas for protection and development at municipal, regional and state levels. These efforts include the BioMap Project created in partnership by Massachusetts Executive Office of

Environmental Affairs (EOEA) and the Natural Heritage & Endangered Species Program and the MetroFuture Plan created by the Boston Metropolitan Area Planning Council (MAPC). Integrate goals and action strategies across scales.

Green infrastructure planning supplements and informs smart growth by targeting priority protection areas with high value animal habitat, ecological functioning (cleansing air and water) and recreation resources. Green infrastructure planning is increasingly used to guide development away from priority protection areas and towards areas where transportation and infrastructure needs can be met most efficiently and sustainably (Benedict and McMahon, 2006). In a site-level example, the location of the preserved open space component of a conservation subdivision should be designed to create linkages with adjacent preserved open space. In a municipal level example, planners should prioritize infill, greyfield and brownfield development and building re-use. At regional and state levels, reduce growth pressure on farm, forests and other open spaces by encouraging growth in central cities, near existing infrastructure and hubs of transportation (Executive Office of Energy and Environmental Affairs (EOEA), 2008).

Local environmental constraints must be carefully considered, especially sewage capacity. Towns such as Southborough, with no municipal sewer system and poorly draining soil have remained low density to accommodate septic systems. New developments require package treatment plants. Hopkinton currently uses Westborough's sewer treatment plant but is slated to build its own. Both cases present challenges for new developments because sewage user fees are partly determined by the number of hook-ups. To keep sewage user fees reasonable, there is a density

threshold, requiring coordination amongst several parties to determine when a plant goes on-line. Alternative wastewater treatment options should be considered by project designers. Many options for ecologically processing both greywater and blackwater are available, from constructed wetlands to Living Machines (Todd and Todd, 2004).

Capitalizing on existing informational and educational resources lends consistency to the messages and concept definitions used by various levels of government. Furthermore, communities with limited financial resources for planning efforts can save time by using some of the extensive existing materials available online. One example is the Smart Growth/Smart Energy Toolkit by the Massachusetts Executive Office of Environmental Affairs (EOEA). It contains case studies, model bylaws, PowerPoint slide shows and brochures on approximately fifteen different topics such as form based codes (FBC), transfer of development rights (TDR) accessory dwelling units (ADU) and agricultural preservation (Executive Office of Energy and Environmental Affairs (EOEA), 2008).

6.3 Consider Community & Context in Project Designs

Previous studies as well as this one confirmed that people like what is familiar to them, as respondents favored images and descriptions of neighborhoods similar to their own. As discussed in chapter 4, these insights indicate that the compatibility of new development proposals depends not just on town character, but neighborhood character as well. When a project proposal contains densities higher than prevailing conditions, responding to a site's context is imperative. Numerous recommendations

for design techniques that reduce the perception and impact of density found in previous studies were detailed in chapter 2.

One of the most significant findings of this study was the potential for "Manor Houses" to be adapted to local vernacular architectural styles (such as Battle Road Farm), to allow a project to achieve greater densities in rural and rural/suburban locations where apartments or row houses could look out of context. Respondents from Hopkinton and Southborough indicated, quite clearly, that building height was a major factor in the perceived compatibility of the photo scenes. To accommodate this concern, a project's density could be distributed in more, shorter buildings and the additional loss of open space could be compensated for with green roofs.

The importance of trees, nearby nature and views of vegetated open space has been a reoccurring theme in this study and many prior (Ryan, 2002, 2006; Arendt et. al., 1994; Kaplan 2001, 2004; Kearney, 2006; Sullivan, 2006; Jorgensen, 2007). Trees and other vegetation should be used for screening views of buildings or other elements. Preserving existing natural site features is typically easier than replacing them later. In most situations, it will be better ecologically to preserve the plant and animal communities on-site than try to recreate an equally robust environment. This study found a high level of support for open space protection. Thus, project proposals which incorporate the protection of important natural site features and a sizeable amount of open space with high ecological value will be better received and more likely to garner approval for more compact neighborhood layouts.

The time has come for greater acceptance of ecologically productive landscaping. Surprisingly, in this study, an image with tall meadow grass in a front

yard as well as an image of a community garden situated prominently amongst homes was both rated very highly. This indicates that acceptance of turf alternatives may be on the rise. The first example, of attractive, low maintenance perennials is a good choice for homeowners who do not want the maintenance and expense of turf. Designers should promote attractive and functional alternatives. Many, if not all, of the typical uses of lawns can be accommodated by creating plentiful, equitably distributed public parks. If homeowners would be willing to replace their individual lawns with more ecologically productive landscaping in exchange for sufficient opportunities to use nearby (walking and biking distance) public parks for games, barbeques and the like, it could greatly reduce the overall regional land area devoted to turf. The second example, of the community garden, requires more maintenance and social organization, yet highlights the self-sufficiency and food security aspects of sustainable development.

In this study, numerous respondents indicated that having nearby transit opportunities were very desirable in the written questions, yet responded unfavorably towards the photo with the commuter rail stop. This highlights the importance of good design, as it was the appearance of the commuter rail stop and not the idea of its presence near a residential development which was offensive. Transit opportunities should be nearby, with well designed visual and auditory buffers.

6.4 Know the Market for Sustainable Development

Although the housing market is currently experiencing a dip in many locations across the country, the metropolitan Boston region has excellent long term prospects.

This study corroborates many others that claim that a significant portion of the home buying market not only desires new urbanist/ smart growth/ sustainable development features (such as common open space, shorter commute times, pedestrian friendly layout, proximity to amenities and environmentally friendly buildings and site design), but is willing to pay more and trade a larger yard for them (Bright, 2007; Goldberg, 2007; Meyers, 2001; National Association of Realtors, 2004; Schmitz, 2004; Steuteville, 2007; Tu and Eppli, 1999, 2001; and Zweigart, 2007).

Housing needs change according to life stages. Respondents with children at home preferred the photographs appearing to have the lowest densities more than those respondents without children. Smaller homes and yards appeal more to young professionals, empty-nesters and retirees. This knowledge should encourage developers to pursue such designs. Investments in 'going green' can be accounted for in the sale price of the home and marketed as such.

6.5 Involve the Community, Address Concerns & Gain Support

Recommendations in this section are meant to help municipal officials, developers or professionals in related positions in addressing community concerns and gaining support for their projects, plans and policies. This study found that respondents have strong environmental values but may not be able to connect them with land use planning concepts. One of the most interesting findings was the dramatic difference that a slight change in wording made in respondents' ratings of two otherwise identical answers. 'Compact developments that protect open space' was given a significantly higher rating than 'compact neighborhood layout.' This

suggests two key insights, first, that development proposals with a preserved open space component will be better received by the community and second, that support for planning efforts hinges on how well their rationale is communicated.

Presentations, local media coverage and informational materials (available in print and on-line) as well as other lines of communication should be utilized to demonstrate the environmental and public benefits of plans, programs and policies. Common ground can be found if the rationale behind objectives (such as increasing densities, creating affordable housing or mixing commercial and residential uses) is explained in terms that matter to the community. Involve the public in the planning process by providing ways to gather their input, such as community meetings, forums, workshops or on-line. Charrettes can be conducted to generate ideas for improving specific locations, such as downtown, an intersection or a neighborhood; as well as to generate community-wide ideas for a new master plan, bylaw or to address special topics. Prior to, or in conjunction with public outreach, create a project or program to demonstrate the commitment of the municipality (or other such organization or corporation) to leading by example. For example, conduct an energy efficiency overhaul on all municipal buildings; establish a town employee carpool program or a local farm to school procurement program.

An important topic that should be addressed is the widely-held misperception that large-lot residential zoning preserves community character. Interestingly, many respondents indicated disgust for large-lot, ugly “McMansions” that drive up property taxes, yet many also perceive large-lot residential zoning as a way to preserve community character. Other methods of preserving community character should be

discussed as well as the cumulative negative consequences of the conversion of farms and forests to lawns. Many residents will likely be receptive to this information, as 35% of respondents stated that they would be quite willing to trade a large yard for an environmentally friendly site design, should they be shopping for a home.

As mentioned earlier, design techniques that ameliorate the perception and impact of increased densities are useful. However, to assuage the concerns of community members, they must also be communicated. Visualizations tend to be effective communication tools. For example, pictures of Battle Road Farm would likely win more supporters for similar projects than its verbal description as, '120 units of mixed-income housing at 10 units per acre with an additional 12 acres of preserved open space.'

Visualizations would be especially important for gaining the support of the sub-group of respondents that favors preserving farms, quiet streets and the calm, scenic, low-density character of their town. This is because they also indicated that concerns related to a proposed development would be greatest regarding aesthetics and differing housing types or styles. These results indicate that overcoming opposition to denser residential development could be achieved if visualizations for proposals include attractive, appropriate-looking architecture, a preserved open space component, high quality landscaping plans and well thought out strategies for dealing with traffic (Ryan, 2002, 2006; Arendt et. al., 1994; Churchman, 1999; Haughey, 2005). To ensure that development is in accordance with the best interests of the community, planners should work with developers to predict and mitigate citizens' concerns.

The most readily apparent strategy for targeting messages to specific audiences based on this study looks at peoples' current residential setting. As mentioned earlier, people prefer neighborhoods similar to their own. This knowledge can be used to win support by emphasizing (or de-emphasizing) certain aspects of a proposed design in conversations or informational materials depending on the neighborhood type of the intended audience. For example, residents of both pre-1945 neighborhoods and rural areas reported significantly higher levels of appreciation for the small, rural and historic characteristics of town, than those that did not claim to live in either type of neighborhood. Therefore, winning the support of a resident from a historic or traditional neighborhood or rural areas may require an explanation of how a development proposal will not adversely impact these characteristics. Whereas to appeal to residents of village and town centers, planners could highlight aspects of a proposal that relate to affordable and diverse housing, variation in building types, styles and sizes and compact and connected neighborhood layouts.

Finally, residents of cluster developments seem to be natural allies for sustainable development. They have already chosen to live in one type of alternative development model, a choice in favor of ecological site design. Fittingly, this group reported a significantly higher level of willingness to both trade a large yard for sustainable development features and to pay up to 20% more for sustainable development features. Residents of cluster developments, compared to residents of other types of neighborhoods place more importance on a diverse tax base, compact developments that protect open space, affordable housing, concentration of new development near existing, footpaths, transit opportunities and proximity to

amenities. Also interesting about residents of cluster developments (with similar results in previous studies), they reported seeing less change to their towns, possibly because they are buffered from such impacts by the preserved open space in their neighborhoods. Quite probably related, residents of cluster developments reported that in the event of proposed development, aesthetics or differing type or style of development would not be as much of a concern, as it would be for those who do not live in cluster developments. If residents of cluster developments are buffered from changes in their town by open space, it serves to reason that a new cluster development may be less obtrusive to current community members than a conventional subdivision. Therefore, residents of cluster developments may be ideal candidates to talk about how good site design can accommodate growth and maintain community character. Willing parties could be recruited to share their experiences and help promote other proposals.

6.6 Summary

These recommendations are certainly not exhaustive. Selecting appropriate strategies has as much to do with knowing the specifics of a certain community as it does with the advice of experts. The following table (6.1) summarizes the key recommendations indicated by this study.

Table 6.1: Summary of Key Recommendations

Planning for Sustainable Development
Work across political jurisdictions and with stakeholder groups.
Support and capitalize on existing efforts.
Take advantage of existing educational materials, tailoring messages to audiences from different neighborhoods.
Site Design and Landscaping
Consider using "Manor Houses" with regionally appropriate architecture in clustered formations in rural and rural/suburban locations and/or when a proposal calls for densities significantly higher than prevailing conditions.
Attention to the quantity and quality of preserved open space is crucial for winning acceptance of increased residential densities.
Use trees and other vegetation for visual screening.
Promote attractive and functional turf alternatives for home gardens and plentiful, equitably distributed public parks for turf-based activities.
Ensure nearby transit opportunities, with well designed visual and auditory buffers.
Education and Communication
To gain public acceptance, clearly explain the rationale for increasing residential densities and use high quality design visualizations.
Address the misperception that large-lot residential zoning preserves community character.
Residents of cluster developments may be ideal candidates to talk about how good site design can accommodate growth and maintain community character.
The Smart Growth Market Niche
Smaller homes and yards appeal more to young professionals, empty-nesters, retirees.
Potential smart growth homebuyers are looking for shorter commute times, pedestrian friendly layouts, proximity to amenities, preserved common open spaces and environmentally friendly buildings and site design.

CHAPTER 7

CONCLUSION

As this study goes to print, the national average price of regular unleaded gasoline is over $4 a gallon and rising. How much longer will average American citizens be able to afford the daily 20, 40, 60 or 80 mile commutes to work that are so typical today? How soon will folks be asking themselves if the space and quietude provided by their far-flung suburban home is worth the hundreds of dollars spent on gas every month? What happens if America wakes up a year from now and finds gasoline is over $10 a gallon? When something occurs that affects millions of Americans simultaneously, it can be difficult for society to grapple with the massive effects. It is crucial that planners begin to prepare for the possibility that increases in gas prices may result in a demand for certain types of housing that could far outstrip today's supply. Waiting too long to ensure a sufficient supply of diverse housing options located near city and town centers might be disastrous.

Gas scarcity alone is a good reason to strive for energy efficient, human scaled, compactly designed neighborhoods but, as this study has shown, is far from the only reason. Encouragingly, survey responses suggest that environmental values are now nearly ubiquitous, at least in metropolitan Boston's affluent suburbs. Discouragingly, there seems to be a limited comprehension of the connections between the spatial arrangements of land uses and the environment. Respondents perhaps appreciate sustainable development as a concept but are disconnected to its

applications, processes and methods, especially those outside of development-oriented professions.

The metropolitan Boston region has seen many changes and they are bound to keep coming. The nature of those changes is still up for debate. The danger of doing nothing is a potential outcome where low-density land use patterns remain dominant and communities become built-out before they have a chance to accommodate growth and change in a pattern that has less negative impact on affordability and open spaces. The good news is that at this time, opportunities for embracing sustainable development are numerous.

The best outcome of this study would be a deepening of knowledge about local residents' desires, concerns and values in the minds of planners, landscape architects, policy makers and builders who then transform those insights into marketable homes that support environmental and community goals. Providing diverse housing options that reduce auto dependence and use land efficiently would give people the opportunity to choose affordable homes that reflect their environmental values and provide a sustainable future for the region.

APPENDIX A

SURVEY AND PHOTO BOOKLET

PERCEPTIONS OF RESIDENTIAL NEIGHBORHOODS SURVEY

• How much do the following contribute to what you like about living in your town?
Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much

1 2 3 4 5 historic atmosphere
1 2 3 4 5 close to work
1 2 3 4 5 affordable
1 2 3 4 5 good fit with our lifestyle
1 2 3 4 5 many trees

1 2 3 4 5 convenient to stores and restaurants
1 2 3 4 5 small town atmosphere
1 2 3 4 5 recreational opportunities
1 2 3 4 5 good schools

1 2 3 4 5 sense of community
1 2 3 4 5 open space and natural areas
1 2 3 4 5 rural character
1 2 3 4 5 feels like home
1 2 3 4 5 neighborliness among residents
1 2 3 4 5 other _____

• How much has your town changed since you've lived here? (circle one below)
1 = none 2 = a little 3 = some 4 = quite a bit 5 = extremely

• How much have you seen the following specific changes in your town?
Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much

1 2 3 4 5 more new houses
1 2 3 4 5 fewer farms, fields and woods
1 2 3 4 5 less affordable
1 2 3 4 5 loss of important views, landmarks, or places due to development
1 2 3 4 5 increased traffic
1 2 3 4 5 less open space (undeveloped land)
1 2 3 4 5 other _____

• How important do you think the following features are for a residential area?
Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much

1 2 3 4 5 street trees
1 2 3 4 5 aesthetically pleasing buildings
1 2 3 4 5 convenient shopping/ dining opportunities
1 2 3 4 5 nearby parks and open space
1 2 3 4 5 safe
1 2 3 4 5 nearby transit (public transportation)
1 2 3 4 5 walking and biking paths

1 2 3 4 5 privacy
1 2 3 4 5 mixture of housing types
1 2 3 4 5 quiet, low traffic streets
1 2 3 4 5 landscaping around homes/ buildings
1 2 3 4 5 large yards
1 2 3 4 5 connected to existing neighborhoods
1 2 3 4 5 preserves natural areas (i.e., woods, streams, wetlands)

1 2 3 4 5 varied building styles and sizes
1 2 3 4 5 views to nature and other open space from home
1 2 3 4 5 affordable
1 2 3 4 5 compact neighborhood layout
1 2 3 4 5 shared common areas (i.e., open space, recreation areas)
1 2 3 4 5 environmentally friendly building materials and practices
1 2 3 4 5 serviced by town water and sewer
1 2 3 4 5 other _____

• How important are the following issues to you?
Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much

1 2 3 4 5 protecting the environment
1 2 3 4 5 diversifying the local economy/ tax base
1 2 3 4 5 conserving water
1 2 3 4 5 concentrating new residential development around existing centers
1 2 3 4 5 creating affordable housing in town

1 2 3 4 5 preserving forests and other natural areas
1 2 3 4 5 protecting drinking water quality
1 2 3 4 5 recycling
1 2 3 4 5 reducing energy use
1 2 3 4 5 developing more stores and restaurants in town

1 2 3 4 5 promoting compact developments that also protect open space
1 2 3 4 5 preserving farms
1 2 3 4 5 slowing the pace of residential development in town
1 2 3 4 5 other _____

Photographs: The enclosed photo booklet shows scenes of innovative residential settings. Please indicate how well they fit with the character of your town. The more compatible the setting is with certain areas of your town, the higher the number you would circle for the photograph.

Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much
Please mark your answers on these pages

page one

1. 1 2 3 4 5
2. 1 2 3 4 5
3. 1 2 3 4 5
4. 1 2 3 4 5
5. 1 2 3 4 5
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10. 1 2 3 4 5
11. 1 2 3 4 5
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13. 1 2 3 4 5
14. 1 2 3 4 5
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16. 1 2 3 4 5

page three

17. 1 2 3 4 5
18. 1 2 3 4 5
19. 1 2 3 4 5
20. 1 2 3 4 5
21. 1 2 3 4 5
22. 1 2 3 4 5
23. 1 2 3 4 5
24. 1 2 3 4 5

page four

25. 1 2 3 4 5
26. 1 2 3 4 5
27. 1 2 3 4 5
28. 1 2 3 4 5
29. 1 2 3 4 5
30. 1 2 3 4 5
31. 1 2 3 4 5
32. 1 2 3 4 5

page five

33. 1 2 3 4 5
34. 1 2 3 4 5
35. 1 2 3 4 5
36. 1 2 3 4 5
37. 1 2 3 4 5
38. 1 2 3 4 5
39. 1 2 3 4 5
40. 1 2 3 4 5

• Would you rate these photographs <u>differently</u> if you knew the following about these projects?

Scale: 1 = much lower 2 =a little lower 3 = the same 4 = a little higher 5= much more

1 2 3 4 5 built with environmentally friendly building materials (e.g., recycled products)
1 2 3 4 5 located near existing transit stops
1 2 3 4 5 used environmentally-sensitive site planning to protect nearby streams and wetlands
1 2 3 4 5 energy efficient homes
1 2 3 4 5 included some homes that were affordable to low-income residents
1 2 3 4 5 preserves existing trees and open space
1 2 3 4 5 received a national or state Smart Growth Award
1 2 3 4 5 certified by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™

• Have you ever opposed a new residential development in the area where you currently live?

No __ Yes ___ if yes, please list reason(s) _____

• If a new residential development was proposed in your area please indicate the degree to which the following would be concerns?

Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much

1 2 3 4 5 traffic
1 2 3 4 5 school costs
1 2 3 4 5 loss of open space
1 2 3 4 5 increased potential for crime
1 2 3 4 5 water quality or quantity
1 2 3 4 5 other environmental issues
1 2 3 4 5 concern for my property value
1 2 3 4 5 increase in taxes
1 2 3 4 5 different housing type or style than existing neighborhood
1 2 3 4 5 aesthetics
1 2 3 4 5 other _____

• While there are many factors that would affect your decision if you were looking for a new home, how willing would you be to make the following choices:

Scale: 1 = not at all 2 = a little 3 = somewhat 4 = quite a bit 5 = very much

trade a large yard for the following features?

1 2 3 4 5 shorter commute time
1 2 3 4 5 common open space (parks and natural areas)
1 2 3 4 5 environmentally friendly site design
1 2 3 4 5 location within walking distance of schools, stores and restaurants

pay up to 20% more for the following features?

1 2 3 4 5 green building materials and practices
1 2 3 4 5 a more central location
1 2 3 4 5 pedestrian friendly/ walkable

• **Which of the following best describes your neighborhood? (check all that apply)**

_____Village center or town center
_____Pre-1945 neighborhood
_____Post-1945 neighborhood
_____Rural with country roads
_____Lakeside
_____Cluster development (contains commonly-owned open space)
_____Other _____

• **Which of the following best describes your place of residence?**

_____Single-family detached house
_____Apartment
_____Condominium
_____Townhouse
_____Other _____

 How long have you lived at this address? _____ yrs.

 Do you: ___ rent **___** own

 How many acres is your property at this address? _____

 Before living at your current home, which best describes your previous neighborhood/home?

_____Homes and yards were similar in size
_____Smaller homes, closer-together
_____Larger homes and yards
_____Apartment
_____Condominium/ Townhome
_____Other _____

 Your age under 20__ 20-29__ 30-39 __ 40-49 __ 50-59 __ 60-69 __ 70-79 __ 80+ _

 Your gender Male____ Female____

 How many people are in your household? _____

 How many in your household are under 18? _____

 Household income under $50,000_$50,000-$99,999_$100,000-$299,999_$ 300,000+__

Please feel free to add any more comments on the back of this page.
<u>Please return this survey in the postage-paid envelope</u>. The photographs are yours to keep. THANK YOU FOR YOUR TIME!

1.

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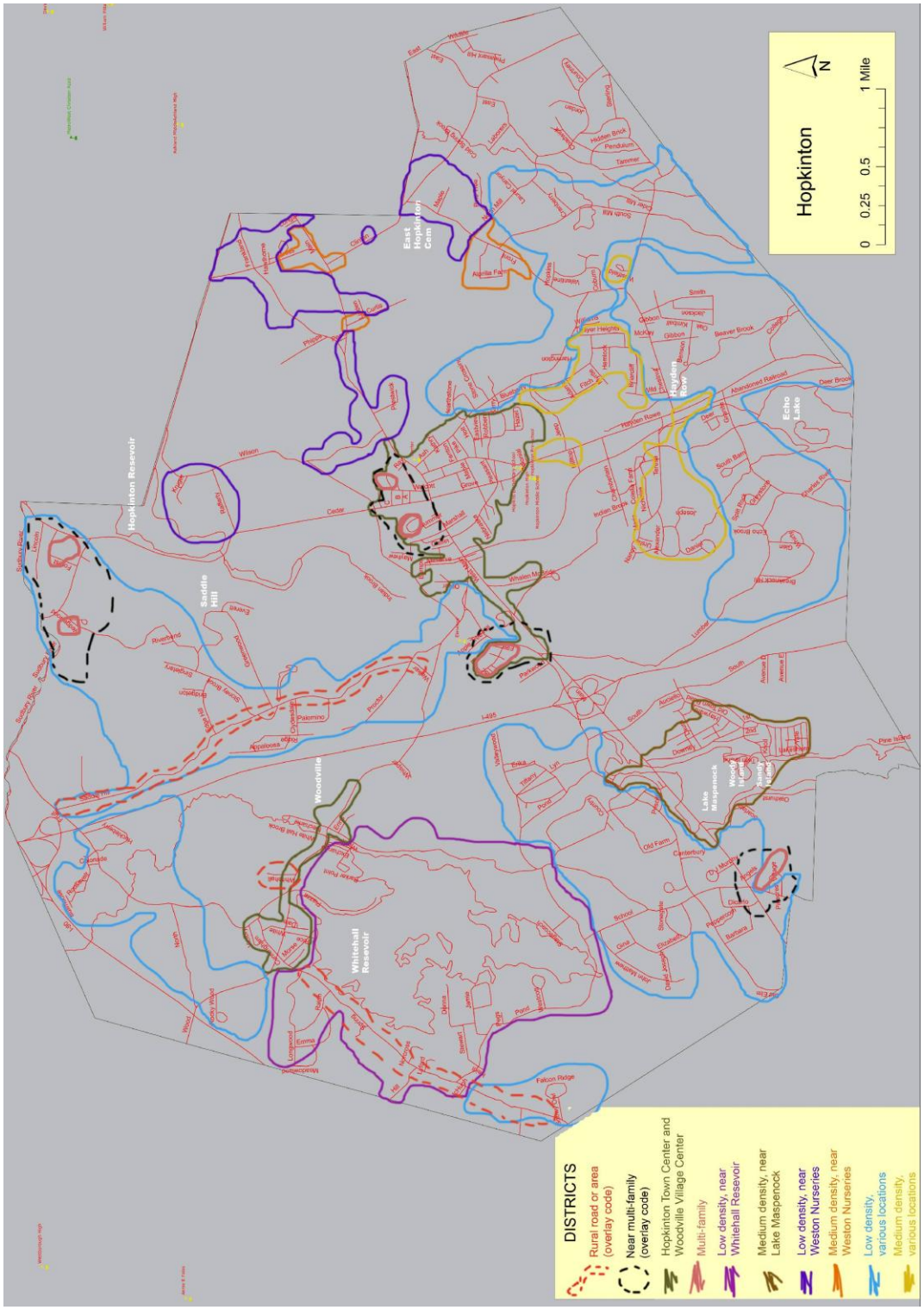
Page Five

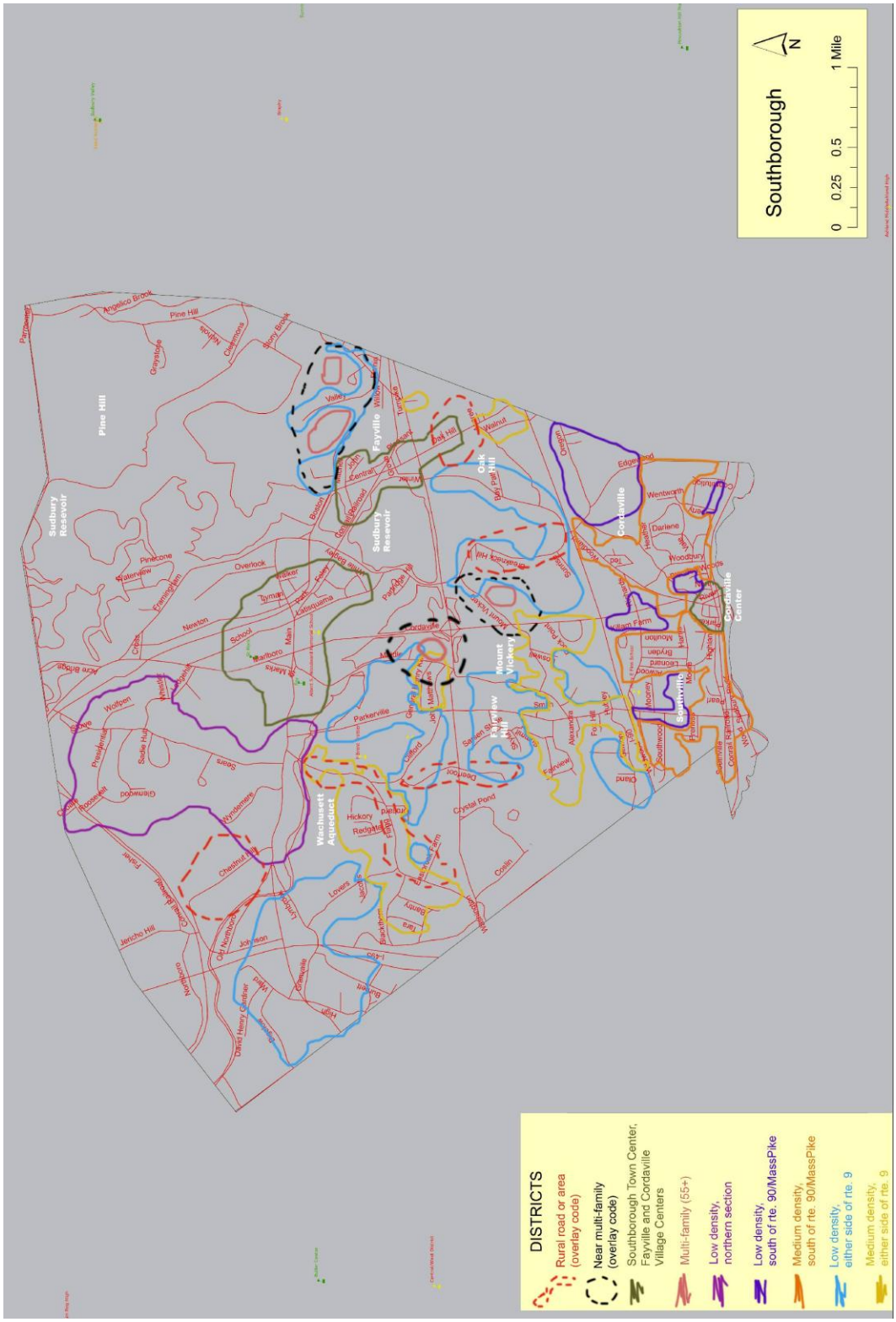
APPENDIX B.1

MAP OF DISTRICTS, HOPKINTON



APPENDIX B.2

MAP OF DISTRICTS, SOUTHBOROUGH



APPENDIX C

PHOTOS: MEAN RATINGS, BY DEVELOPMENT

Residential Development	Mean	Residential Development	Mean
Battle Road Farm	**3.28**	**Prairie Crossing**	**3.06**
P37	4.02	P17	3.78
P12	3.64	P6	3.74
P19	3.56	P25	3.14
P29	3.21	P33	2.93
P13	2.76	P15	1.81
P4	2.48		
Kentlands	**2.56**	**Churchill Homes**	**2.30**
P30	3.83	P11	2.70
P20	3.27	P28	2.55
P5	2.45	P36	2.55
P18	2.23	P2	2.23
P14	2.01	P39	2.08
P38	1.61	P22	1.70
Stapleton	**2.07**	**Canton**	**1.89**
P7	2.95	P10	2.61
P9	2.27	P3	1.98
P32	2.23	P27	1.95
P24	1.73	P35	1.80
P40	1.68	P21	1.53
P31	1.60	P23	1.43
Arborpoint	**1.49**		
P16	2.10		
P34	1.48		
P26	1.43		
P8	1.29		
P1	1.13		

APPENDIX D

PHOTOS: MEAN RATINGS, HIGHEST TO LOWEST

Rank	Photo	Number of Valid Responses	Mean	Standard Deviation
1	P37	246	4.01	1.01
2	P30	245	3.82	0.99
3	P17	247	3.76	1.21
4	P6	248	3.72	1.06
5	P12	249	3.62	1.05
6	P19	248	3.56	1.07
7	P20	248	3.26	1.20
8	P29	248	3.21	1.09
9	P25	248	3.13	1.11
10	P33	247	2.93	1.13
11	P7	246	2.93	1.36
12	P13	248	2.77	1.10
13	P11	246	2.69	1.14
14	P10	250	2.62	1.28
15	P36	244	2.56	1.14
16	P28	249	2.53	1.11
17	P4	248	2.48	1.11
18	P5	248	2.46	1.21
19	P9	251	2.27	1.04
20	P2	250	2.24	1.05
21	P18	247	2.24	1.09
22	P32	248	2.22	1.11
23	P16	250	2.09	1.04
24	P39	249	2.06	0.95
25	P14	247	2.00	0.95
26	P3	249	1.98	1.03
27	P27	248	1.94	1.03
28	P15	250	1.81	0.96
29	P35	246	1.80	0.96
30	P24	248	1.71	0.90
31	P22	248	1.70	0.96
32	P40	248	1.67	0.92
33	P38	250	1.60	0.88
34	P31	249	1.58	0.95
35	P21	249	1.53	0.77
36	P34	248	1.48	0.84
37	P26	249	1.43	0.75
38	P23	249	1.43	0.76
39	P8	248	1.30	0.67
40	P1	250	1.14	0.44

APPENDIX E

SAMPLE OF RESPONDENTS' COMMENTS

E.1: Perspectives on Residential Choice
"I personally like being able to walk to get milk, newspapers, small groceries, so sense of small town is important to me. All developments should be as efficient as possible. New cluster developments have obviously been added to this town but the condo style is either very expensive or uninteresting or both and none seem to have the convenience of walking (perhaps one)."
"I like the concept of cluster development much more than the reality of actually living in one. It seems appropriate for 55+ communities, or in urban environments (Somerville, Cambridge), but I sacrificed my commute time to gain privacy, trees, a yard. I'm not looking for a pseudo-urban community. I think it will take a lot more education to sway people like me, who just moved to the suburbs in the past 5-10 years."
"We downsized one year ago and in the process moved onto a main road very near the center of town. We didn't anticipate proximity to the center to be the plus it's turned out to be!"
"It fascinates me that so many folks move to towns such as mine for what was (though some still feel is) the country/rural feel. And yet the homes they purchase or build not only destroy that which they seek but form insulated barriers. The lack of connection of people within these huge homes and developments is a study in and of itself!"

E.2: Desires for Town's Future
"Southborough should do nothing to change zoning so that it may retain existing character."
"I would be open to Office Park that is environmentally friendly with a lot of open space. I wish downtown are would preserve historic feel"
"I believe that bike routes leading to the commuter rails can be very useful. I used the minuteman bike trail and the subway when I lived in Arlington, MA (except in extreme weather) and found it very feasible."
"In the future it should be law that all new construction - commercial and residential be environmentally friendly. More solar! Cost should not dictate what materials are used - our future is truly at stake because of oil. We need new energy sources."
"Do not wish to see high density multi-unit housing developments"
"Please keep Southborough's rural setting. We do not wish to become a Marlboro, a Framingham or a Westborough. The reason we have stayed in Southborough for 34 years is because of its rural setting. For those interested in a more urban feel there are many other choices"
"More mixed use development would be a good thing, with small businesses and residential; such as cafes, hairdressers, bookstores. Preferably an expansion of our existing very small and old village centers (we have three of them within the town borders). We live within walking distance of one of these old centers"

E.3: Perspectives on Affordability
"We've always wanted to live in Southborough because it was rural but within a few miles of all our shopping needs and near several major routes. In the last 20 years the town has changed so much with the building of all expensive homes, massive sizes, and complete renovations of all our schools which I feel was unnecessary! This all takes away from Southborough's original charm and quaintness. The new wealth in town has led to most of these changes which in turn has made Southborough unaffordable to the very people that have made Southborough what it was, a very desirable town. The new assessments on these million dollar homes has raised property taxes throughout our town. As with many other families that have been here for years, we can't wait for the market to get better so we can move away to a similar but more affordable location. It's sad that we have to leave a town that we always found to be perfect for our family, but the reality of it is, we can't afford to live here anymore."
"We do not need affordable housing in town. We do not ask towns like Dover and Wellesley to build affordable housing for our family. Capitalism needs to work. Those that have earned the right to afford to live in a good town should enjoy the benefit. Those that have not earned the right should not!"
"We are concerned that the lack of diverse living options (lack of apartments, etc) will render Southborough too exclusive and affluent in the future. Southborough needs more affordable housing and more housing choices. However, proposed developments must fit the character of the community's existing homes and buildings. Scope and size of projects should take into consideration the small population size of the town and not overwhelm the community."
"I would favor town initiative for affordable housing - to thwart chapter 40B impositions"
"The town of Hopkinton was a small blue collar and very affordable town 18 years ago. Shortly after we moved here the Mcmansions started being built. Up until recently the town did not promote much new business development, therefore the homeowners taxes had had to carry the town. Now the town is proposing development all over to bring in tax dollars. The residents are not happy, the town government has turned into a joke with all of the mismanagement and Hopkinton is not the quaint town it once was."

E.4: Perspectives on Current Conditions
"This town lacks in recreational facilities, bike paths, walking paths."
"Building in Southborough has been somewhat limited because of lack of municipal sewage - zoning by-law limits apartment building"
"Traffic becomes more of a quality of life issue as development progresses. Water is and will continue to be an issue for Hopkinton. Bike paths and walking trails can be planned to make it easier to move around."
"Although expansion and development is unavoidable, we are taking away space for wildlife to live, and destroying trees and views of nature. The views are being replaced with buildings - not nature."

E.5: Reactions to the Photographs
"In rating the pictures, the pictures I gave low ratings were usually because they looked too urban, were too tall or too close together, or the style of the dwelling was not in keeping with the New England style of homes in this town. This town has a few townhouse/communities but I don't want to see it go in that direction necessarily, which is why I rated many of the townhouse/community pictures low.
"It was difficult to judge the photos without a real purpose. I.e.: I wouldn't want the whole town to look like the photos but if planned growth were necessary and the designated areas were away from the center or town - some of the apartments/condominiums would be appropriate. I think it is very important to change/vary the design of the houses in a residential neighborhood. The neighborhood is much more visually appealing. Also try to keep some old growth trees and side walks. Hills are much more appealing than flat residential developments, vary the proximity to the street or the angles of the houses or lot sizes. Try not to put all of the backyards together. Make sure the colors of the houses change to eliminate the feeling of track homes."
"These photos mostly depict high density cluster housing I have seen in other regions of the country. Main objections to these style developments are density, the look of "cookie cutter" units, the ugly look of parking lots and on street parking, urban sprawl. Our community primarily is single family with off street parking and most lots/homes unique or varied in the neighborhood."
"The photos in this are generally not compatible with my town because the have many homes/dwellings of three stories and our town building code for residences is two stories. Also most photos did not have large trees. We also have 1/2 acre and 1 acre zoning which you obviously did not. So your question as to whether the photos 'fit' was no. Whether I like the town pictured is a different question. yes it would be a fine place to live - it looks like Celebration, FL. But we chose our town because of its rural character, open space, many trees, farms, etc. We'd prefer two acres zoning to forestall increased town burdens and traffic. We like a small population where we know everyone in town. We like our privacy. We incorporate environmentally friendly ideas into our personal property."

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